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TEACHING PROCESS AS A LEARNING EXPERIENCE--THE EXPERIMENTAL USE OF STUDENT-LED DISCUSSION GROUPS.

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THE PURPOSE OF THIS STUDY WAS TO INVESTIGATE THE EFFECTIVENESS OF SMALL STUDENT-LED DISCUSSION GROUPS AS A METHOD OF INSTRUCTION. PERFORMED WERE TWO TYPES OF STUDIES INVOLVING OVER 1,400 STUDENTS IN 42 COURSES--(1) COMPARATIVE STUDIES WHICH EMPLOYED CONTROL GROUPS AGAINST MORE TRADITIONAL INSTRUCTIONAL PROCEDURES, AND (2) INNOVATIVE STUDIES WHICH EXPLORED THE MANY POSSIBLE VARIATIONS OF THE NEW APPROACH AND ITS COMBINATIONS WITH OTHER TEACHING METHODS. WHEN ACHIEVEMENT WAS THE CRITERIA OF EFFICACY, THE RESULTS OF THE COMPARATIVE FINDINGS WERE MORE OBVIOUSLY FAVORABLE. BOTH STUDENTS AND TEACHERS REPORTED GAINS IN STUDENT RESPONSIBILITY, FROM MEMORIZATION TO COMPREHENSION AND UNDERSTANDING. THE INNOVATIVE STUDIES FREED THE INSTRUCTORS FROM THE CONSTRAINT OF CONTROL PROCEDURES AND RESULTED IN SEVERAL CREATIVE VARIATIONS IN THE USE OF THE TECHNIQUE. AT THE COMPLETION OF THE PROJECT A SIGNIFICANT NUMBER OF TEACHERS AND STUDENTS HAD CHANGED THE CONCEPTION OF THEIR ROLES AND THEIR IDEAS ON HOW STUDENTS LEARN. THESE ROLE CHANGES AND THE IMPACT OF THE PROJECT ON THE CAMPUS ARE ALSO DISCUSSED. (AUTHOR)

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St. Norbert College

West De Pere, Wisconsin

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Chapter I. Introduction

A. Background

Independent study has come to mean any procedure which is designed to increase students' responsibility for their own education. However, traditional independent study programs have concentrated on the honors or superior student and have been too demanding of teacher time. In a recent statement Baskin (1966) cites the extension of independent study to all students as one of the major developments in college teaching. One way of accomplishing this extension is through the use of small student learning groups within the regular course system (Beach, 1966; Grib, 1966; Leuba, 1966; Webb, 1966). These procedures incorporate many of the advantages of independent study while eliminating the disadvantages of superior student emphasis and the costly one-to-one teacher-student relationship.

The variety of procedures subsumed under the general designations "student learning groups" and "student-led discussions" in this report have evolved from earlier trials to increase student responsibility and independence. In 1963, experimentation was begun at St. Norbert with a procedure in which students prepared and tape recorded their own course lectures (Webb, 1965). Major deterrents to the effective use of the student lecture method were the absence of a live audience and the demanding task for the teacher in responding to the large bulk of student lectures. Consequently, student lecturing was replaced by having small groups of four to six students teach one another by their discussion of course materials. The common theme underlying both approaches was the old idea that one learns by teaching.

B. Rationale

The rationale underlying student learning groups can best be described by analyzing the teaching process in relation to known principles of effective learning; or, in other words, by viewing teaching as a learning experience.

In teaching one learns about his subject because he is faced with the responsibility of teaching it. Many investigators believe that getting the student to accept this type of responsibility for his own learning is the key variable in any effort to increase educational achievement (Patton, 1955;

Thistlethwaite, 1960; Gruber, 1965). Empirical studies support this proposition and indicate that gains in achievement result from situations which increase student responsibility, such as non-attendance at class and from independent study (Caro, 1962; Milton, 1962; Beach, 1966). In a review of studies on teaching, McKeachie summarizes this belief: "It may well be the more we teach the less our students learn!" (1962, p. 315).

Carpenter (1959) observed from his experience with the Pyramid Plan at Penn State that any serious efforts to improve student achievement must of necessity deal with the problem of improving relevant student motivations. When students are faced with the task of explaining their own position to another, as is the case in teaching, motivation should be enhanced. An additional motivational source in the discussion method pointed out by Craig (1965) is the uncertainty in not having the answers neatly packaged by the teacher.

In the teaching process one is an active learner. Krumboltz and Weisman (1962) found that active responding (written responses) to programmed instruction produced better retention after a two week interval, while Ripple (1963) concluded that active involvement contributed to increased learning of programmed materials, but reinforcement alone did not. Bloom (1953), in his study on thought processes during lectures and discussions, showed more active thinking was stimulated by discussion than lecture. In a study on opinion change Watts (1967) found that active participation (writing an argument) resulted in superior recall and greater personal involvement than did passive participation (reading an argument).

Teaching also involves the practice and verbalization of learned materials. In discussions students have the opportunity to practice and to verbalize the concepts they have learned. Especially if students are to achieve application, critical thinking or other higher cognitive outcomes, it is reasonable to assume they should have an opportunity to practice them (McKeachie, 1966).

In brief, student discussion groups attempt to make use of some important principles of learning: increased student responsibility, motivation, active learning, practice, and verbalization.

C. Related Research

The 1956-60 Antioch College experiments which compared independent study with regular instruction (Churchill and Baskin, 1961), employed small student groups in combination with other independent study procedures. Although their general conclusions pertain to a variety of independent study methods, they offer encouragement for more wide spread use of similar methods. The findings showed that students learn equally well under either independent study or regular instruction. Further, that success with independent study was not restricted to the superior student alone. But perhaps most important was their consensus that a great untapped potential for learning exists within the student himself.

In a prior study at St. Norbert (Webb, 1965) student-led and instructor-monitored discussion groups were used in three regular college courses as an adjunct to lecture sessions. Statistical analysis of the final course averages of control and experimental treatments showed no reliable differences favoring either procedure. However, student and instructor enthusiasm was noticeably greater in the student-led discussion treatments.

In an extensive study at the University of Colorado Gruber and Weitman (1962) employed self-directed study methods in 19 different courses. As in the present study the procedures varied according to the course, but the unifying theme was the reduction of the amount of time spent in formal classes. Small self-directed study groups were used in some courses. For example, in a course in educational psychology the self-directed study groups, composed of five or six students, met in the small groups two days a week and with the instructor one day a week. In contrast, the control group attended three lectures a week. The results of the educational psychology study were in conformity with the two major findings reported by Gruber and Weitman: First, when the criterion of efficacy is the learning of course content, the results generally show no powerful arguments for or against either self-directed study or conventional methods. Second, when the criterion of efficacy is a group of attitudinal changes such as critical thinking, curiosity, and so forth, the findings are more obviously favorable for self-directed study.

Beach (1966) used instructorless groups of five students who attended no regular classes but met at least once a week to study and discuss course materials. They also met with the instructor once every three weeks to discuss course materials or any problems that arose. While covering the same material the control group met three times a week for a conventional lecture-discussion. The results were similar to those of Gruber and Weitman: While there was no significant difference in achievement between the two groups, the experimental group was significantly higher in quantity and quality of study, amount of required and non-required reading, and in publications consulted in writing term papers.

The procedures described by Leuba (1966) for his student-led discussion groups at Antioch College resemble closely those employed in the St. Norbert student learning groups. In both cases there was monitoring by the instructor via a two-way communication system, the discussions were guided by materials prepared by the instructor, and were used in conjunction with other instructional methods (lectures, films, etc.). Although Leuba did not employ a control group in his studies, he reported fewer D's and F's and more A's and B's using substantially the same examinations and norms as in past classes.

D. Objective

The objective of the present research was to test the effectiveness of small student learning groups in many different college courses with unselected students of varying ability. In reaching this objective both comparative and innovative studies were carried out. The comparative studies employed control groups and/or procedures which pitted student learning groups against more traditional instructional procedures. The innovative studies explored the many possible variations in procedure and combinations with other teaching methods.

Chapter II. Setting for the Research

The outcome of any educational experimentation is a result of the interaction between the environment, the characteristics of the student body, and the experimental method itself. Furthermore, the generalization of the findings to other campuses and other situations demands a careful description of the setting in which the research was conducted.

This chapter will describe the institutional setting under three headings; general information about the college, college environment, and characteristics of the student body.

A. General Information about the College

St. Norbert College is a church-related, undergraduate, co-educational college. It is located in West De Pere, Wisconsin, a city of 10,000 near Green Bay in an urban complex of about 120,000 persons. Although the college is owned and operated by the Norbertine Order of the Catholic Church, the staff is about 70% laymen, and its membership includes persons of various faiths. The regular faculty includes 92 full-time men and women and 23 part-time people. It is fully accredited by the North Central Association. The student-faculty ratio is about 15 to 1.

Majors are offered in the usual liberal arts areas with the addition of several pre-professional programs. The college operates on a ten-week, three-term calendar arrangement, instead of the typical fifteen-week, two-semester arrangement. The class period is seventy minutes. Under the three-term system the usual course load for students is three to four courses per term.

B. College Environment

The College and University Environment Scales (CUES), developed by Pace (1963) and published by Educational Testing Service, was administered to a randomly selected sample of 113 St. Norbert sophomores, juniors, and seniors in January of 1966. The same instrument was administered to about half the faculty (N=46) in April, 1966, during a faculty meeting.

CUES is essentially an opinion poll of what the students think about their campus environment. It attempts to measure--

systematically, objectively, and by students' standards--the prevailing atmosphere, the social and intellectual climate, the style of life of a campus. It does so by asking the respondent to judge whether each of 150 statements about their college is generally true or false. In scoring, a statement is considered characteristic of the institution if at least two-thirds of those responding answer the item in the same way. The items fall into five factor-analyzed categories.

1. Practicality: The degree to which personal status and practical benefit are emphasized in the college environment.

2. Community: The degree to which the college atmosphere is friendly, cohesive and group orientated.

3. Awareness: The degree to which there is a concern with self-understanding, reflectiveness and a search for personal meaning.

4. Propriety: The degree to which politeness, protocol, and conventionality are emphasized.

5. Scholarship: The degree to which competitively high academic achievement is evidenced.

The scores and percentile equivalents obtained by the student and faculty samples are presented in Table 1. The score is the number of items answered in the keyed direction by 66% of the sample, with the highest possible score being 30.

Table 1

Students and Faculty CUES Results

Scale	Students		Faculty	
	Score	Percentile* equivalent	Score	Percentile* equivalent
1. Practicality	12	57	12	57
2. Community	13	63	13	63
3. Awareness	4	12	1	5
4. Propriety	9	42	9	42
5. Scholarship	3	15	4	18

* based on a normative sample of 48 colleges and universities

From inspection of Table 1 it can be seen that there is close agreement between the student and faculty view of the college environment. The results indicate a moderately high emphasis on community, an average concern with practicality and propriety, and low emphasis on scholarship and awareness.

Both students and faculty rated St. Norbert slightly above average on practicality (57th percentile), suggesting a campus where procedures, personal status and practical benefit are emphasized. Concrete, applied, and practical considerations are more important than abstract and theoretical matters.

The highest CUES score was obtained on the community scale (63rd percentile). A high score on community indicates a friendly, cohesive, and group-oriented college. Pace (1963) says community is often characteristic of a small college where there are "friendly and helping relations among the students and between faculty and students." The environment is sympathetic and supportive with a sharing atmosphere and a strong sense of group loyalty.

The low score on the awareness scale can be interpreted to indicate a lack of emphasis on reflectiveness and aesthetic sensitivity. The ratings describe a college environment which de-emphasizes self-understanding and identity, a diminished sense of personal involvement with the world's problems, and a narrow range of appreciations.

St. Norbert was rated slightly below average on propriety (42nd percentile). The responses suggest an environment that is polite, considerate, and cautious with a minimum of rebellious, risk-taking behavior. However, there are some breaches with propriety at parties and in student publications and occasionally students plot some sort of escapade.

The college is viewed as not being a highly intellectual place and not one possessing what might be described as an academic or scholarly environment. Scholarship and intellectual discipline were not considered to be distinguishing characteristics of St. Norbert. There is little emphasis on competitively high academic achievement and serious interest in scholarship.

The score pattern for St. Norbert College is most similar to a group identified by Pace (1963) which includes moderately denominational colleges and a few teachers' colleges (elementary and secondary education are large departments at St. Norbert).

The CUES results suggest that the educational atmosphere of the college was not entirely conducive to the kind of intellectual independence required for the effective use of student-led discussions. Gruber (1965) has concluded from his work at Colorado that for self-directed study procedures to be truly effective, intellectual self reliance should become a powerful tradition on campus. The low scholarship and awareness scores would argue against such an atmosphere being pervasive at St. Norbert. At the time of this writing, however, there is evidence that, partly as a result of the project, this atmosphere is changing. (See Chapter VI)

C. Characteristics of the Student Body

The college has an enrollment of approximately 1,500 full-time students, 55 percent of whom are men and 45 percent are women. Of this number approximately 1,100 are resident students living in residence halls on the campus.

Normally, high school students who rank in the upper 50 percent of their class and whose College Board (S.A.T.) scores are at or near the 500 level are considered academically qualified for acceptance as freshmen. The majority of entering students are of the Roman Catholic faith (98%) and have been educated in Catholic high schools (63%). Ninety-six percent of entering freshmen come from the North Central states. The median family income for freshmen in 1966 was between $10,000.00 and $15,000.00.

Table 2 presents the distribution of College Board (S.A.T.) scores of all students in Term I, 1966, for whom scores were available. The total number does not represent the entire student body since some students are admitted without having taken the S.A.T.

Table 2

Distribution of SAT Verbal and Math scores for all Students in Term I, 1966-67

Score	SAT-VERBAL Number	SAT-VERBAL Percent	SAT-MATH Number	SAT-MATH Percent
750-799	0	0.0	7	0.5
700-749	7	0.5	32	2.5
650-699	49	3.8	82	6.4
600-649	115	8.9	140	10.9
550-599	210	16.3	231	18.0
500-549	294	22.9	266	20.7
450-499	276	21.5	246	19.1
400-449	185	14.4	176	13.7
350-399	117	9.1	80	6.2
300-349	30	2.3	22	1.7
250-299	2	0.2	3	0.2
200-249	0	0.0	1	0.1
$\Sigma=$	1285	99.9	1286	100.0

The distribution of the cumulative grade point averages (CGPA) of all students enrolled in Term I, 1966, are shown in Table 3.

Table 3

Distribution of CGPA at end of Term I, 1966-67

CGPA	Number	Percent
3.5-3.99	105	6.59
3.0-3.49	341	21.41
2.5-2.99	447	28.06
2.0-2.49	483	30.32
1.5-1.99	158	9.92
1.0-1.49	45	2.82
0.5- .99	13	0.82
0.0- .49	1	.01
TOTALS	1593	99.95

The sample of students who participated in the project was unselected. Students typically registered for a course without knowing that an experimental instructional method would be employed. Since there were more than 35 courses spread over eight academic departments there is some assurance that the students are typical of the St. Norbert population.

Chapter III. Research Facilities and Instruments

A. Facilities

The floor plan of the St. Norbert College learning laboratory is shown in figure 1. The lab consists of ten specially constructed booths, approximately seven feet by eight feet, equipped for two-way communication with a monitoring system, and a large, 50-station classroom. The overall plan of the laboratory is designed for maximum flexibility of function.

Each booth is ventilated, carpeted, and has an acoustical ceiling, making it sufficiently soundproof so that all may be used at one time without interference. There is a built-in microphone and speaker in each booth, thus permitting two-way communication with a monitoring console and concurrent tape-recording of each discussion.

Ten tape recorders with jacks connected to a microphone in each booth are located in a bank of small student-carrels (see fig. 2) outside the booths enabling a single assistant to tape the discussions. Each carrel is furnished with a permanently mounted, 4-track tape recorder with language lab earphones. The carrels have formica writing surfaces which can be used for note taking and answering questions related to the recorded material. Since the carrels are separate from the discussion booths, they may also be used individually by students to listen to taped lectures, play back discussions, etc. There also are six additional portable tape recorders which may be taken into the booths for individual or group listening. Immediately adjacent to the carrels is a cabinet for storing taped lectures, discussions, and other audio materials.

The proximity of the booths to a large 50-station classroom permits the students to assemble as one group for feedback and evaluation sessions, introductory lectures, or briefing sessions.

The learning lab booths can accommodate up to seven students, although a more comfortable number is five or six. Some instructors prefer to monitor the on-going discussions, and also offer the students the opportunity to call them when they are in difficulty. In some instances the instructor may leave the monitoring facility and visit the individual

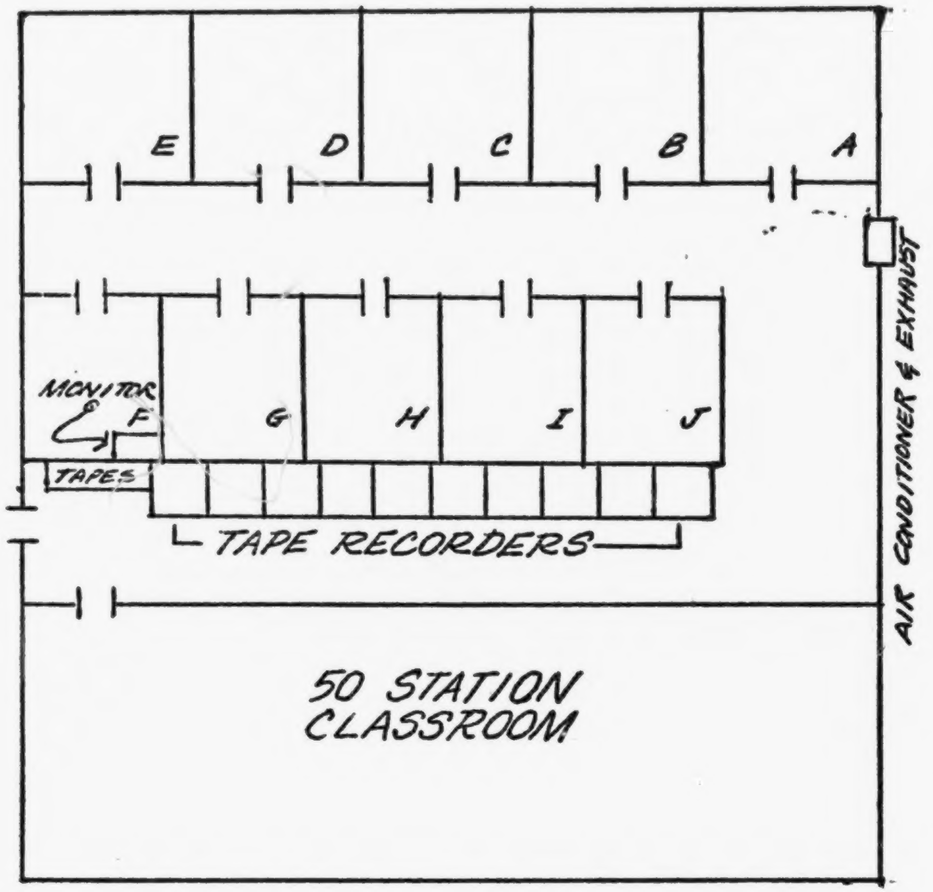

E
D
C
B
A
MONITOR
F
G
H
I
J
TAPES
TAPE RECORDERS
AIR CONDITIONER & EXHAUST
50 STATION
CLASSROOM

FIG. 1- PLAN OF ST. NORBERT COLLEGE LEARNING LABORATORY

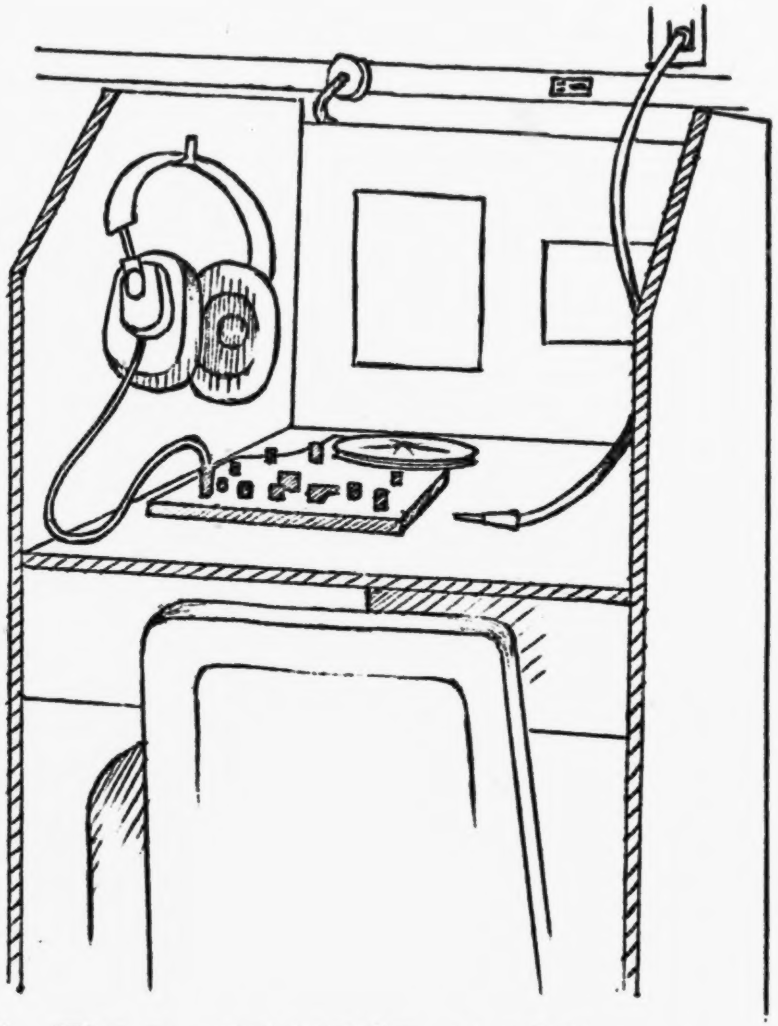


FIG. 2- STUDENT CARREL

booths. Others prefer the students to meet at their own convenience, without the instructor being present for the discussions. The monitoring facility also permits the instructor to play live or tape-recorded material (e.g., music or poetry) to all booths simultaneously for discussion.

B. Forms

In gathering data about the effectiveness of a new instructional procedure it is valuable to collect student opinion. In an effort to systematize this type of data collection several forms were developed.

1. Instructional Method Rating Form:

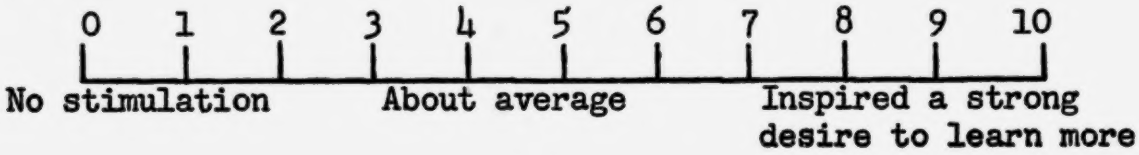
The Instructional Method Rating Form has evolved from two earlier instruments. Initially, it was an attempt to gather student opinion about group performance during the discussions. Somewhat later it was used to compare the discussion method with other types of instruction by the same teacher.

The first form was the Group Meeting Questionnaire (See Appendix A). It was designed to collect student evaluation of that day's class using eleven statements concerning group functioning. It contained items relating to preparation, interest, guide questions, usefulness, etc. Space was also provided for free comments or suggestions for improvement. The forms were filled out by the students at various times during the term. The individual student responses were tabulated by a student assistant who presented them to the instructor in summary form.

For a number of reasons the Group Meeting Questionnaire proved inadequate and was therefore replaced by the Discussion Rating Form (See Appendix A) which remedied these deficiencies. However, almost immediately it was replaced by the Instructional Method Rating Form (See Appendix A). This final form was very similar to the Discussion Rating Form with the addition and modification of items so as to apply to any instructional method. The student was asked to rate on a 10-point scale nine items relating to a particular class period.

An example of the manner of item presentation is:

1. How much has today's class stimulated your interest in the course?



The remaining items in the Instructional Method Rating Form were:

2. How much did today's class stimulate in you a sense of independence and responsibility in your own growth and learning?

3. How much knowledge or information did you gain in today's class?

4. My own preparation for today's class was:

5. How would you rate your own active attention and involvement during today's class?

6. How free did you feel in today's class to ask questions, disagree or express your own ideas?

7. How much has today's class pointed out gaps and inadequacies in your comprehension of material?

8. To what extent did today's class encourage critical thinking in the solution of problems?

9. The overall value of today's class for me as a learning experience was:

The space for comments and suggestions for improvement, which proved valuable in the earlier forms, was retained.

After each administration a summary of the responses (See Appendix A) was prepared and given to the instructor. The summary sheet included a word or phrase identifying the item followed by a line divided into ten segments upon which the responses were plotted. The summary presents the individual responses, the median response for each group, and the median response for the entire class. An example of the summary for the first item appears below.

Interest	0	1	2	3	4	5	6	7	8	9	10	Median All Groups
f			A				A A A	A B	B B B	B		
Mdn							Ⓐ		Ⓑ			6.5

The letters identify the group to which an individual belongs. Thus the letter "A" above the "2" in the interest category indicates that one student from group A rated the discussion 2 or of limited value for stimulating interest in the course. The circled A below the 6 represents the median rating of all group A members. The number 6.5 at the extreme right is the median for all raters.

The Instructional Method Rating Form has been used in a number of ways in the project. First, it has been used, as were its predecessors, to assess the functioning of the learning groups. The instructors used the summaries to compare the relative effectiveness of the groups as judged by their own members. This could be done by comparing the median responses of the various groups. Second, it was used to measure group progress by comparing the median group ratings at successive points in time during the term. Third, since the evaluation is not of the teacher per se, but of the method, it has been used to compare the student's judgment of the effectiveness of student learning groups with other methods of instruction by the same teacher. The instructors could also use the forms to help determine which method of instruction was most effective for him. Finally, the comment section provided prompt feedback for the instructor enabling him to modify the course in progress. This increased communication was particularly useful in those courses where innovations in the method were introduced.

2. End of Course Questionnaire:

The purpose of this questionnaire was to gather student opinion at the end of the course regarding the student learning group procedure. The form was made available to all instructors to use after the course was completed.

The first form developed, the Student Opinion Questionnaire (See Appendix A) consisted of both free-response and fixed-response items. In the free-response portion the student was asked to list the main advantages and disadvantages of the procedure, to suggest improvements, and write down any advantages not measured by examinations. In the fixed-response portion the student responded "agree", "disagree", or "?" to items which on an a priori basis were thought to summarize the main advantages and disadvantages of the method. There was also a forced-choice item in which the student was asked to indicate his preferred method of instruction.

The revised form was called the End of Course Questionnaire (See Appendix A). In this form only the main advantages and disadvantages items were retained in the free-response section, since the student response to the other two questions usually did not add any new information.

The fixed-response statements were revised after tabulating the most frequently occurring responses to the main advantages and main disadvantages sections of preceding forms. There was also space for the student to comment on any of the fixed-response statements.

The questionnaires were filled out anonymously with the only information requested being the course title, the number of discussions they participated in, and their grade point average.

C. Student Manual

The need for a manual giving some instructions for the carrying on of discussions became apparent early in the project when it was discovered that students were having difficulty with the techniques of group discussion. The Manual for Student-led Discussions (See Appendix B) briefly outlines specific procedures for effective group discussions under such headings as the importance of preparation, student responsibility, techniques for increasing meaningful communications, etc. It also lists eight characteristics of an effective group member.

Chapter IV. Comparative Studies

Whenever a new instructional procedure is introduced, the first questions asked by the potential users are: How good is it? How does it compare with methods currently used? Will the students suffer in the attainment of course objectives from using the new method?

In an effort to provide answers to some of these questions a series of comparative studies were carried out. The studies were designed to test the effectiveness of the small student learning groups when pitted against a variety of more traditional instructional procedures. The typical research design employed randomly selected groups of students of comparable ability who were taught using experimental (learning groups) and control (usually lecture-discussion) treatments. The relative success of the methods was evaluated by means of test results and both student and instructor opinion ratings. A total of six comparative studies, involving four courses, were undertaken. These studies are summarized in Table 4.

Table 4

Summary of Comparative Studies

Course	Year	Experimental N	Control N	Control Procedure
Psychological Statistics	1965-66	22	29	Instructor-led discussion
Philosophy of Human Nature	1965-66	40	42	Lecture
Philosophy of Human Nature	1966-67	19	74*	Lecture
Introduction to Literature	1966-67	27	29	Instructor-led discussion
Introduction to Literature	1966-67	17	33	Instructor-led discussion
History of Painting	1966-67	25	23	Lecture

* Two control Groups, N=38 and N=36.

A. Psychological Statistics: Term III, 1965-66

Psychological Statistics at St. Norbert College is a required course for both Psychology and Sociology majors. Because it is a required course and because of the mathematical nature of the material, typically student interest had not been very high. Another difficulty had been getting the students to work through the exercises in the text in order to gain practice in applying statistical principles to new situations.

During one term a workbook was tried, but it proved unsatisfactory. It was believed that the introduction of student learning groups would help both to increase student interest and to give practice in working out problems. Further, it was hypothesized that students in the learning groups would display higher achievement than those learning by a control method.

Course description:

This course is an introduction to basic statistical methods and reasoning with emphasis on those techniques and applications used in the behavioral sciences. The main objectives are to demonstrate the derivation and application of formulas for measures of central tendency and variability, correlation and regression, the binomial expansion and tests of significance; and to equip the student with basic techniques for the analysis and interpretation of data resulting from research in the behavioral sciences.

In the past the instructional method was lecture with frequent questions directed to the students by the professor. The class was held in a large lecture room with an average enrollment of about 50 students. The students taking the course are mostly Sophomores and Juniors with a sprinkling of Freshmen and Seniors. Attendance at class was optional.

Sample:

In the spring of 1966 fifty-one students registered for Psychological Statistics. There was only one lecture section, but students could choose from two lab sections, one meeting in the morning and the other in the afternoon. The plan was to use one lab section for the experimental procedure and the other for the control procedure. At the time of registration students did not know about the experimental nature of the course or whether they would be in the control group or the experimental group. It was decided to use the morning section as the control group simply because the afternoon was more convenient for arranging materials used with the experimental group. The cumulative grade point averages for the experimental and control groups were 2.63 and 2.61 respectively; the difference is not statistically significant.

Experimental procedure:

For two days a week the students attended in common a lecture given by the instructor. During the lab period, generally the third period of each week, the experimental and control treatments were applied.

The experimental group, composed of 22 students, met in changing groups of four to five students in the learning laboratory booths (see figure 1). During the first lab period the students were given the Manual for Student-led Discussions. Preparation for the discussion was aided by guide sheets (See Appendix C) which showed what the instructor thought was important by asking questions and providing statistical problems to be solved.

In the experimental group the discussions were carried on entirely by the students with the instructor stationed at the monitoring center where he could listen to portions of the ongoing discussion or be called to assist a group having difficulty. Occasionally he left the monitoring center to join the particular group experiencing difficulty in order to explain or clarify immediate problems. Each discussion was routinely tape recorded for later analysis.

The control group, composed of 29 students, met for the lab periods in a classroom. During this period the instructor led the discussion, making use of the same guide sheets as used by the experimental group. This was a departure from the usual procedure in this course and was designed to control for the Hawthorne effect. The instructor generally read the questions from the guide sheet and asked for answers from the students. After one or more had responded the instructor summarized and integrated their answers and, at times, gave additional material. As in the experimental group, all the discussions were tape recorded.

The Instructional Method Rating Form was administered several times during the term and the End of Course Questionnaire was filled out by both experimental and control groups. The same two unit exams and final examination were given to both groups in common.

Results:

In this course there were three instructional modes: lecture, student-led discussion and instructor-led discussion. In order to quantify the amount of student activity under the three procedures a sample tape recording of each procedure was selected for analysis. A classificatory scheme was used, modified somewhat from Flanders and Amidon (Flanders, 1965, Amidon, 1966) with two main categories: Teacher Talk and Student Talk. The amount of time spent in each category for the three instructional modes is presented in Table 5.

Table 5

Percent of Time Spent in Teacher Talk and Student Talk
Under Different Methods of Instruction

Category	Method of instruction		
	lecture	instructor-led discussion	student-led discussion
Teacher Talk	96%	65%	13%
Student Talk	4%	35%	87%

On inspection of Table 5 it can be seen that student activity was higher in the discussion periods than during a lecture and that it was highest in the student-led discussions.

The main results regarding the achievement of course objectives are presented in Table 6. This table shows the final course averages of the experimental and control groups based on two unit exams and a final exam. Although the experimental group achieved a higher final average, the difference of +2.14 was not significant.

Table 6

Comparison of Final Course Averages for Experimental and Control Treatment in Psychological Statistics

	N	Mean	SD
Experimental	20	73.80	12.06
Control	29	71.66	14.24
t		.55	

When the number of discussions attended is taken into account, however, the difference between the final averages becomes significant. There was a total of seven discussions held during the term. It was decided to perform a further analysis of the data with those students who had attended at least four discussions based on the argument that those attending three or fewer discussions could not be considered to have received the treatment. The results are presented in Table 7. The reduced N in the experimental group might indicate either less student interest or less dependence on the instructor.

Table 7

Comparison of Final Course Averages of Students Attending at Least Four Discussions

	N	Mean	SD
Experimental	13	77.00	5.74
Control	28	71.21	14.30
t		1.84*	

$* p < .05$

The Instructional Method Rating Form was administered three times during the course. On April 18 it was given to both groups who had attended in common a lecture on the binomial theorem. On April 21 it was given to both groups after their discussion period covering the same material as the

April 18 lecture. An examination of the results in Table 8 indicates that both groups rated the discussion period as more effective than the lecture. Furthermore, the experimental group rated the student-led discussions higher on every item than the control (instructor-led discussion) group.

Table 8

Comparison of Median Student Ratings of Lecture, Student-led Discussion, and Instructor-led Discussion on the Binomial Theorem

Item	Median ratings		
	lecture	student-led discussion	instructor-led discussion
1. Interest	5.5	8	6
2. Responsibility	5	8	6
3. Information	7	9	7
4. Preparation	5	7.5	7
5. Involvement	7	9	8
6. Freedom of expression	7	9.5	9
7. Comprehension	7	9	7
8. Critical thinking	6	8.5	7
9. Overall value	6	10	7
$\bar{X}$ =	6.17	8.72	7.11

Table 9 presents the results from the May 5 administration of the rating form. On that day both groups discussed the same material with the experimental group engaging in student-led discussions and the control group attending an instructor-led discussion. Again, the experimental group rated their class period higher on every item than did the control group.

Table 9

Comparison of Experimental and Control Group Ratings of Their Respective Procedures

Item	Median Ratings	
	experimental group	control group
1. Interest	7	5.5
2. Responsibility	7	6
3. Information	8	6
4. Preparation	8	6.5
5. Involvement	8	6
6. Freedom of Expression	10	7
7. Comprehension	9	7
8. Critical thinking	8	6.5
9. Overall value	8	6.5
$\bar{X}$ =	8.11	6.33

Student opinion:

On the last day of class the End of Course Questionnaire (See Appendix A) was filled out anonymously by students in both the experimental and control groups. On the fixed response portion of the questionnaire the students were asked to agree or disagree with a series of statements comparing the discussions with other methods of instruction. The answers are summarized in Table 10. The experimental and control group responses were significantly different on only two items, numbers 4 and 6. The fact that there were not more

Table 10

Percentage Responding Agree, Disagree, or ? to Statements on
End of Course Questionnaire (Control and Experimental Groups)
in Psychological Statistics: Term III, 1965-66

Item	Control (n=19)			Experimental (n=17)			Chi-square
	A%	D%	?%	A%	D%	?%	
1. More thorough preparation	89	5	5	88	12	0	1.49
2. Understanding rather than memory	79	16	5	94	0	6	2.90
3. Ideas clarified	72	28	0	94	6	0	2.90
4. Learning involvement	44	21	34	88	6	6	6.97*
5. Students mislead one another	26	48	26	31	56	13	1.04
6. Subject interest greater	21	11	68	56	25	19	8.78**
7. Lecture more valuable	6	61	33	6	69	25	0.19
8. Think and organize ideas	68	5	26	59	12	29	0.67
9. Another student's viewpoint	58	37	5	65	12	23	4.28
10. Better understood later classes	63	16	21	77	23	0	4.13
11. Aided test preparation	84	5	11	65	18	18	1.93
12. Learning related to everyday experience	32	37	32	42	29	29	0.44
13. Discussions not necessary	16	53	32	29	65	6	3.98
14. Difficulty in finding essentials	63	21	16	70	18	12	0.26
15. Lead to incorrect conclusions	37	37	26	53	29	18	0.98

* $p < .05$ ** $p < .02$

significant differences is understandable in that both groups were evaluating discussion techniques with the difference being that in the experimental group the students met in small groups and led their own discussion while the control group met in one large group with the instructor leading the discussion. Overall, both groups agreed that the discussions made them prepare more thoroughly than did a regular class meeting, that the discussion periods placed more emphasis on comprehension and understanding than on memorization, that in discussing their ideas were clarified, that because of the discussions they better understood subsequent class meetings and lectures, and that the discussions aided in test preparation. Both groups disagreed with statements that a lecture period would be more valuable than a discussion period and that the course would have been just as successful without the discussions.

On the two items to which the groups responded differently the experimental group was more in agreement with statements that the discussions were responsible for more active involvement in the learning process (item No. 4) and led to a greater interest in the subject matter (item No. 6).

Another item asked the students to indicate their preference for the method of instruction in future classes. The responses are presented in Table 11. In general, the students in both the experimental and control groups preferred the method by which they were taught in this course.

In the free response portion of the questionnaire, the main advantages listed by the experimental group are summarized as follows: The discussions were helpful in preparation for examinations and for the overall organization of the course. The verbalization of one's own knowledge and discussion with others aids in the learning process and leads to a better understanding of the principles underlying what one is learning. The discussions were an incentive to better and continuous preparation. Finally, the relaxed and informal atmosphere makes the class a pleasant experience.

The most frequent disadvantage mentioned was that lack of preparation by the students can destroy the effectiveness of the discussion. This was in spite of the fact that 88% of the students reported that their class preparation increased while participating in the discussion groups. Other disadvantages reported were the absence of the instructor, dissatisfaction with the discussion guide sheets, and that the nature of the material was not conducive to discussion.

Table 11

Number of Students Choosing Various Methods of Instruction in Psychological Statistics: Term III, 1965-66

Method	Experimental group	Control group
1. Total lecture - no discussions	2	0
2. Lecture, instructor-led discussion	2	11
3. Lecture, occasional student-led discussions	11	4
4. Lecture and more frequent student-led discussions	2	4
5. No lecture, total student-led discussions	0	0
6. Other	0	1

Instructor opinion:

The instructor believed that the student-led discussion groups achieved their goal. That is, that they increased student interest and involvement in the course, and that they gave the students practice in working out problems. Other advantages reported by the instructor were that the teacher in monitoring the discussions became aware of where the students were having difficulty with the material. In the past the instructor had trouble determining what concepts were causing problems. Another advantage was that the students, in working through the discussion questions, became aware of their own lack of full understanding of some concepts, which would not have occurred if they had not been required to discuss these concepts.

Further results:

This was the second time this course was taught using the student-led discussion procedure in conjunction with a control group. In 1965 as part of a previous research project (Webb, 1965) the instructor employed student-led discussions in essentially the same way as described here, but the control treatment consisted of a group of 32 students who met in a large classroom on the days the experimental group were having their discussions. The control group either worked independently, or in small groups if they so chose, on the discussion problems. A comparison of the final course averages for both groups resulted in a significant difference at the .10 level in favor of the experimental group.

Because of the essentially similar results of the two previous studies it was decided not to carry on any further comparative studies in this course. However, the instructor used the method again in the third term of 1967 with a class of 30 students. The instructor was entirely satisfied with the results and plans to continue to use the procedure in the future.

The End of Course Questionnaire was again used and, if anything, the student response was even more enthusiastic than on the two previous administrations. The results of the fixed-response items are presented in Tables 12 and 13.

The majority of respondents agreed with the following statements:

> The discussions generally made me prepare more thoroughly than if I were attending a regular class meeting (85%).
> In relation to other methods, the discussion periods placed more emphasis on comprehension and understanding than on memorization (100%).
> In the process of discussing the materials with other students, my own ideas were often clarified (97%).
> Because of the discussions I was more actively involved in the learning (81%).
> The discussions force you to think and organize ideas (92%).
> One advantage of the discussions is in the interaction with other students you get other points of view (92%).
> Because of the discussions I understood better subsequent class meetings and readings (88%).
> The discussions were helpful in preparing for the tests in the course (96%).
> One disadvantage in the discussions is arriving at incorrect conclusions (68%).

Statements that were disagreed with by most of the students were: that a lecture period would be more valuable than a discussion period (76%), and that the course probably would have been just as successful without the discussions (80%).

Table 12

Percentage Responding Agree, Disagree, or ? to Statements on End of Course Questionnaire in Psychological Statistics: Term III, 1966-67

Item	Percentage responding		
	Agree	Disagree	?
1. More thorough preparation	85	12	3
2. Understanding rather than memory	100	--	--
3. Ideas clarified	97	--	3
4. Learning Involvement	81	--	19
5. Students mislead one another	20	44	36
6. Subject interest greater	44	20	36
7. Lecture more valuable	--	76	24
8. Think and organize ideas	92	--	8
9. Get other student's viewpoint	92	4	4
10. Better understood later classes	88	4	8
11. Aided test preparation	96	--	4
12. Learning related to everyday experience	20	32	48
13. Discussions not necessary	4	80	16
14. Difficulty in finding essentials	44	36	20
15. Lead to incorrect conclusions	68	20	12

As is shown in Table 13, eighty-four percent of the students preferred to learn by a method which included student-led discussions as part of the procedure.

Table 13

Number and Percentage of Students Choosing Various Methods of Instruction in Psychological Statistics: Term III, 1966-67

Method of Instruction	Number	Percent
1. Total lecture - no discussions	0	0
2. Lecture and instructor-led discussion	3	12
3. Lecture and occasional student-led discussions	10	38
4. Lecture and more frequent student-led discussions	12	46
5. No lecture, total student-led discussion	0	0
6. Other	1	4

In the free-response portion of the questionnaire the main advantages mentioned by the students were the freedom of expression, the opportunity to "clear up problems" and to discover inadequacies in their understanding of the material. Some representative responses were:

> "You go through the material that is in the book and come out with a better knowledge of the material. It is the practical work that helps. You are able also to pick up information that you did not understand before because you are working with other students."

> "It gives you a chance to talk over questions with fellow students. Some of these questions may seem stupid to some and therefore you are afraid to ask the teacher. You can help other students this way and in turn they can help you work out your own difficulties."

"Works very well in pointing out to the student where his inadequacies lie in knowledge of material."

"I think the discussion periods were the most instructive periods of the course."

"It helped me to prepare better; showed me how much I didn't know. Cleared up little details I wasn't sure of."

The chief disadvantages listed were that the students were not always prepared, the uncertainty as to whether or not they had arrived at a correct answer, and that students tend to mislead one another. The instructor attempted to remedy the last two disadvantages by routinely asking the groups for their answers to the problems and, if they were incorrect, by showing them the correct solution. Rather than merely supplying a group with the correct answer, the instructor usually suggested a solution and asked the students to carry it through. However, if they were unable to arrive at a correct solution he would then explain it to them completely.

B. Philosophy of Human Nature: Term III, 1965-66

Two separate comparative studies were carried out in this course a year apart. Since there were differences in the technique used and in the textbook, they will be described separately.

Philosophy of Human Nature is a general education course required of all students at St. Norbert College. It is usually taken in the junior or senior year and the typical class size is forty students per section. In the past the instructor experienced difficulty in getting the majority of students involved beyond the minimum level needed to obtain a passing grade. It was hypothesized that the introduction of student learning groups would lead to greater student involvement and that achievement as measured by course examinations, reading reports, and classroom participation would be at least as high as that of students learning under the usual procedure. In the past the instructional procedure was lecturing interspersed with questions asked by the teacher.

Course description:

This course is an inquiry into the nature of man with special attention given to the questions of the nature of human knowledge, human unity, human freedom and immortality. Representatives of five important philosophical traditions of the Western world are considered, viz. Classical and Scholastic thought, Dialectical thought, Pragmatic-Naturalist thought, Analytic-Positivist thought, and Existentialist-Phenomenological thought.

In the spring of 1966, students were rostered by computer into two sections so that approximately equal numbers were assigned to each section. One section (N=40) was selected to receive the experimental procedure and the other (N=42) the control procedure on the basis of the availability of the learning laboratory facilities. The cumulative grade point averages for the experimental and control groups at the beginning of the course were 2.79 and 2.72, respectively; the difference was not statistically significant.

Experimental procedure:

For seven out of twenty-eight classes the experimental section met in the learning lab in groups of approximately five students and, in place of the usual lecture period, did one of the following: spent the entire period in student-led discussion; received a brief introduction by the instructor and then spent the remaining time in student-led discussion; or, finally, in some periods half the time was spent in small group discussion and then the students assembled in the classroom for an instructor-led discussion of difficulties that arose during the student-led discussion.

The experimental group was introduced to the new procedures by giving each student a Manual for Student-led Discussions (See Appendix B). For each discussion a series of guide questions prepared by the instructor was distributed, usually in advance of the meeting. During the discussions the instructor generally remained at the monitor station, but occasionally would leave to join one of the groups to answer their questions. The discussions were routinely tape recorded and the instructor occasionally listened to some tapes in order to identify areas in need of clarification.

The control group was taught in the usual manner of the instructor (i.e., lecture with questions asked by the teacher) with the following modifications: seven class meetings were tape recorded for later analysis to characterize the procedure followed; occasionally the control group received copies of the discussion guides used by the experimental group. In some classes the lectures and questions centered on explaining material that was misunderstood or gave difficulty in the experimental group. Thus, to some degree an advantage of the experimental procedure was also used to strengthen the control procedure.

The Instructional Method Rating Form was administered several times during the term to both groups and the End of Course Questionnaire was filled out by the experimental group. Two unit exams and a final examination were given to both groups.

Results:

In order to characterize the classroom activity under the control and experimental treatments, tape recordings of two lectures (control) and two student-led discussions were analyzed according to the classificatory scheme modified from Flanders and Amidon (Flanders, 1965; Amidon, 1966). The data from the two lectures and two discussions were combined for each procedure and the average amount and percent of time spent in each category is presented in Table 14. As would be expected the amount of student activity is far greater during a discussion than during a lecture.

Table 14

Classification of Classroom Activity Under Control (Lecture) and Experimental (Student Discussion) Procedures in Philosophy of Human Nature: Term III, 1965-66

Category	Lecture		Student Discussion	
	Amt. of time	% of time	Amt. of time	% of time
A. Teacher Talk-total time	52'-15"	87.4	0'-17"	0.4
1. Giving directions	2'-12"	3.6	0'-17"	0.4
2. Lecturing	37'-28"	62.7	-	-
3. Asking questions	7'-11"	12.0	-	-
4. Answering questions	5'-23"	9.0	-	-
B. Student Talk-total time	7'-30"	12.5	74'-38"	99.6
1. Answering teacher questions	6'-23"	10.6	-	-
2. Asking questions	1'-07"	1.8	7'-16"	9.7
3. Answering student questions	-	-	24'-22"	32.4
4. Explanation	-	-	43'-10"	57.5

The final course averages of the experimental and control groups based on reading reports, classroom participation, two unit exams and a final examination are shown in Table 15. The difference, as hypothesized, was not significant.

Table 15

Comparison of Final Course Averages for Experimental and Control Groups in Philosophy of Human Nature: Term III, 1965-66

Group	N	Mean	SD
Experimental	40	82.78	5.92
Control	42	81.28	7.08
t		1.03	

Only one comparison was made using the Instructional Method Rating Form. On May 13 the forms were administered to both groups. The experimental group rated their small group discussions while the control group rated a lecture-discussion by the instructor. The results are shown in Table 16. Overall, the experimental group gave slightly higher ratings than the control group.

Table 16

Comparison of Experimental and Control Group Ratings of Their Respective Procedures in Philosophy of Human Nature: Term III, 1965-66

Item	Median Ratings	
	Experimental	Control
1. Interest	7.0	6.0
2. Responsibility	7.0	6.0
3. Information	6.0	7.0
4. Preparation	7.0	5.0
5. Involvement	7.0	6.5
6. Freedom of Expression	9.0	4.5
7. Comprehension	7.0	7.0
8. Critical Thinking	7.0	7.5
9. Overall Value	7.0	7.0
$\overline{X}$ =	7.1	6.3

Student opinion:

Since the items on the End of Course Questionnaire were directed toward the evaluation of the discussion technique, it was administered to the experimental group only. The replies to the fixed response portion of the questionnaire are summarized in Table 17.

Table 17

Number and Percent of Experimental Group Responding Agree, Disagree, or ? to Statements on End of Course Questionnaire in Philosophy of Human Nature: Term III, 1965-66

Item	Agree		Dis-agree		?	
	No.	%	No.	%	No.	%
1. More thorough preparation	21	64	6	18	6	18
2. Understanding rather than memory	32	97	0	0	1	3
3. Ideas clarified	27	82	2	6	4	12
4. Learning involvement	27	82	2	6	4	12
5. Students mislead one another	12	38	10	31	10	31
6. Subject interest greater	18	55	6	18	9	27
7. Lecture more valuable	8	24	12	37	13	39
8. Think and organize ideas	29	88	2	6	2	6
9. Another student's viewpoint	33	100	0	0	0	0
10. Better understood later classes	20	61	5	15	8	24
11. Aided test preparation	14	42	10	30	9	27
12. Learning related to everyday experience	20	61	6	18	7	21
13. Discussions not necessary	6	18	18	55	9	27
14. Difficulty in finding essentials	20	61	9	27	4	12
15. Lead to incorrect conclusions	19	58	7	21	7	21

The majority of respondents (i.e., 66% or greater) agreed to the following statements: 1) In relation to other methods, the discussion periods placed more emphasis on comprehension and understanding than on memorization (97%). 2) In the process of discussing the materials with other students my own ideas were often clarified (82%). 3) Because of the discussions I was more actively involved in the learning (82%). 4) The discussions force you to think and organize ideas (88%). 5) One advantage of the discussions is in the interaction with other students you get other points of view (100%).

When asked to indicate what method of instruction they would prefer for future classes, 24 students (73%) replied that they would prefer classes which incorporated student-led discussions.

On the free response portion of the questionnaire the main advantages listed were the opportunity to hear the ideas of others, the help in understanding the material, the freedom of expression, the fact that the discussions forced the student to formulate his own ideas and organize the material himself, and the increase in responsibility. The main disadvantages noted were that some students were not prepared, the uncertainty about conclusions reached when the instructor was absent, and the tendency of the discussions to stray from the point.

Instructor opinion:

As a final step in the assessment of the effectiveness of the discussion technique the instructor was asked to write out his own evaluation. The following are representative excerpts from the evaluation made by the instructor:

> "For almost all of the students involved, the discussion periods seemed to entail a much higher degree of active participation, considerably more interest and curiosity, slightly more critical thinking, and a slightly more accurate sense of the adequacy of their preparation and of the adequacy of their grasp of the material, and slightly more success in translation--i.e., in expressing the ideas of the course in non-technical language.
>
> "For a small number of students, perhaps 10%, the discussion periods seemed to entail a feeling of insecurity and discomfort inasmuch as these periods were less structured than the lecture periods, notes were more difficult to organize, and it was not possible to know at any given time whether the conclusions being reached were the 'right' ones.
>
> "For the instructor, the discussion periods provided immediate indication of the strengths and weaknesses of the student understanding and of the effectiveness of the assigned readings and lectures.
>
> "The discussion periods also provided a welcome refreshing change from the relatively unresponsive reaction of many students in a lecture period.

> "As I used the technique, it did not involve a basic change in the role of the teacher. It functioned rather as an auxiliary to what was basically a teacher-led inquiry. Both teacher and student are alerted by the discussions to some of the difficult concepts and to the subjective responses which interfere with communication. But the approach remains fundamentally teacher-led rather than an instance of primarily independent learning.
>
> "Even the limited independence of the student in this approach depends for measurable success on the adequacy of the discussion questions and the 'feedback'."

Based on the results of the final grades, the analysis of tape recorded lectures and discussions, the End of Course Questionnaire, and the teacher's evaluation, it was concluded that both hypotheses were supported; that is, 1) the introduction of student learning groups lead to greater student involvement for the experimental group and, 2) achievement as measured by course examinations, reading reports and classroom participation was at least as high as that of the control group who learned under the instructor's usual procedure.

Term III, 1966-67

In the earlier use of student-led discussions in this course only six or seven periods were allotted to discussion. The instructor felt that there were too few discussion periods for the procedure to produce its full effect. Consequently, in 1967 the number of discussion periods was sharply increased. A further modification was that the discussion periods were split into half discussion and half professor lecture. The instructor felt that the value of the discussions would be increased and that the lecture given in the second half of the period would benefit from the prior discussion.

Experimental procedure:

The instructor taught three sections of the course; two served as control sections and one as experimental. The control sections (N=39 and 36) met three times a week in 70-minute periods of teacher-led discussion for a total of 29 meetings. The method used was similar to the instructor's past procedure. The experimental section (N=19) met twenty times in sessions devoted to approximately 40 minutes of student-led discussion and 30 minutes of lecture. There were also nine 70-minute periods completely devoted to teacher-led discussion.

In order to check the comparability of the groups, analyses of variance were run on three measures of ability for the three groups; cumulative grade point average (CGPA), SAT-Math, and SAT-Verbal. The results are presented in Table 18. None of the F's were significant at the .05 level, and the groups were accepted as comparable.

Table 18

Comparison of Cumulative Grade Point Average (CGPA), SAT-Math and SAT-Verbal Scores for Experimental and Control Groups in Philosophy of Human Nature: Term III, 1966-67

	Experimental			Control, Sec. B			Control, Sec. C			
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	F
CGPA	17	2.74	.46	38	2.69	.45	36	2.77	.50	.25
SAT-Math	14	505	83	38	513	85	34	506	82	.45
SAT-Verbal	14	458	67	38	506	82	34	508	77	2.30

The experimental section was divided randomly into four groups which remained the same throughout the course. A leader was appointed by the instructor on the first day of discussion and since there was no strong sentiment for change they remained at least the nominal leaders for the entire course. During the first class meeting, the instructor discussed with the experimental group techniques of student-led discussion, and at several subsequent meetings he gave a critique of the previous discussions. For the most part he did not interrupt the student-led discussions unless called on to answer a question or clear up a difficulty.

All groups were provided the same study and discussion guides which were general, relatively unstructured questions. These were distributed at least one class in advance of the period in which they were to be used; usually the guides were provided for the entire section of the text to be studied and discussed for the next two weeks or more.

After the first week or so of the course the instructor no longer listened to the tapes since he was able to monitor a representative sample of the student-led discussions and included immediate feedback in his 30-minute lecture at the end of the period.

Results:

The final course averages of the experimental and control groups are shown in Table 19 and the results of an analysis of variance of the data is presented in Table 20. Although control group C scored slightly higher, none of the differences were statistically significant at the .05 level.

Table 19

Comparison of Final Course Averages for
Experimental and Control Groups in
Philosophy of Human Nature: Term III, 1966-67

Group	N	Mean	SD
Experimental	19	78.00	6.23
Control, Sec. B	38	78.29	5.84
Control, Sec. C	36	80.92	4.70

Table 20

Analysis of Variance for Final Course Averages of
Experimental and Control Groups in
Philosophy of Human Nature: Term III, 1966-67

Source	Sum of Squares	df	Mean Squares	F
Treatments	164.74	2	82.372	2.713
Experimental error	2732.55	90	30.361	
Total	2897.29	92		

Student opinion:

The End of Course Questionnaire was administered to the experimental group only. The results of the fixed-response items are presented in Table 21.

Table 21

Number and Percent of Experimental Group Responding Agree, Disagree, or ? to Statements on End of Course Questionnaire in Philosophy of Human Nature: Term III, 1966-67

Item	Agree		Disagree		?	
	No.	%	No.	%	No.	%
1. More thorough preparation	12	71	3	18	2	11
2. Understanding rather than memory	17	100	0	0	0	0
3. Ideas clarified	15	88	1	6	1	6
4. Learning involvement	14	82	1	6	2	12
5. Students mislead one another	6	35	5	30	6	35
6. Subject interest greater	10	59	1	6	6	35
7. Lecture more valuable	3	18	7	44	6	38
8. Think and organize ideas	15	88	1	6	1	6
9. Another student's viewpoint	17	100	0	0	0	0
10. Better understood later classes	5	29	5	29	7	41
11. Aided test preparation	5	29	9	53	3	18
12. Learning related to everyday experience	8	47	2	11	7	42
13. Discussions not necessary	6	35	5	30	6	35
14. Difficulty in finding essentials	13	76	2	12	2	12
15. Lead to incorrect conclusions	10	59	6	35	1	6

On the free-response portion of the questionnaire the most frequently listed advantages were that the discussions increased the students' interest and involvement, made the material more meaningful, and led to better preparation. Some representative responses were:

> "Intellectual stimulation - interest. Have to keep up with the material in order to contribute. Causes one to think, understand, and formulate his own ideas."

> "I feel the discussion lab can be a great benefit to the student in helping him toward a better understanding of the material. He will not simply sit in a class and memorize but will participate in the discussion of the material and hopefully get a better grasp of the material."

The most frequently mentioned disadvantages were the uncertainty as to whether they have arrived at correct conclusions, the fact that the tests seemed to be geared to the classroom lectures rather than the discussion periods, and poor student preparation which at times resulted in lags in the discussion and wasted time.

Instructor opinion:

The instructor's opinion regarding the effectiveness of the procedure was as follows:

> "The test results do not seem to favor either method. I suspect that there is a loss of efficiency in the use of time involved in the procedure that might be offset by increasing the number of class periods required to four per week. In my attempt in 30 minutes or so at the end of each period to outline the material, explain difficult points and answer student questions, I felt there was much too little time available.
>
> "As the student evaluations indicated, I think the student-led small discussion groups have the advantages of increased interest, involvement, and freedom from the inhibiting aspects of large class situations; but, at the same time, there is considerable difficulty in measuring the growth in subjective qualities of understanding, facility in expression, interpretation etc. with the same test instruments used to measure the achievement of the control groups depending largely on teacher-led discussion."

C. Introduction to Literature

Introduction to Literature is a general education course required of all non-English major students who elect to satisfy the core curriculum literature requirement by taking an English Department literature course. The course is intended for sophomore students, but in practice, some sections have contained as high as 50% junior and senior students. It is offered in all three terms and the usual class size is 25 students per section.

This introductory course is a prerequisite for all other literature courses offered by the Department of English. The only prerequisite is the successful completion of a course in English composition.

Course description:

The course is primarily a reading course which seeks to provide the student with methods for increasing his understanding and enjoyment of poems, short stories, novels, and plays using lectures, discussions and written analyses.

Past procedures:

In the past this course has been taught primarily through the teacher-led class-discussion technique, with frequent, brief lectures. The lectures were used to introduce, to clarify or to summarize a topic for discussion.

The teacher had experienced considerable difficulty in getting more than half the students involved in the discussions, in getting the students to comprehend what they had read, and in getting the students to apply the method of objective analysis to the literary works under discussion. The typical student tended to launch immediately into subjective interpretation and criticism before he had achieved a reasonably accurate understanding of what the work contained.

Term I, 1966-67

In the fall of 1966 the instructor taught two sections of Introduction to Literature. One section of 27 students was designated the experimental group on the basis of availability of the learning lab facilities. A second section of 29 students was designated the control group. Neither group knew that they would be involved in an experiment prior to registration. Furthermore, the students were not informed until after the deadline for schedule changes had passed which section would be using the small-group discussion techniques. Table 22 presents the means and standard deviations of the entrance exam (SAT) scores and the cumulative grade point average at the start of the course for both groups. Although the experimental group scored lower on all three measures of ability, the differences were not significant.

Table 22

Comparison of Cumulative Grade Point Average (CGPA), SAT-Math and SAT-Verbal Scores for Experimental and Control Groups in Introduction to Literature: Term I, 1966-67

	Experimental Group			Control Group			
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	t*
CGPA	25	2.55	.53	28	2.67	.51	.86
SAT-Math	27	503	90	27	516	88	.54
SAT-Verbal	27	505	71	27	528	73	1.17

* None of the ts are significant at the .05 level.

Experimental procedure:

The control group was taught by the teacher's usual method as described in the section on past procedures.

The experimental group met in the regular classroom during the first, ninth and tenth weeks of the course. During the second through eighth week regular classroom meetings were alternated with small discussion groups held in the learning lab facilities. During this period a total of nine small group discussions were held. In order to form the groups students in the experimental section were arbitrarily assigned to groups of five or six. They were introduced to the small group discussion procedures by reading the Manual for Student-led Discussions.

In the small group discussions the students applied principles learned during the lecture periods to the analysis of literary works not previously discussed in class. They were directed by guide questions prepared by the instructor which were distributed one class period before the discussion. The control group also received copies of the guide questions and used them as a basis for class discussions.

After 50 minutes of discussion the small groups met as a large group in the classroom. During the remaining twenty minutes the group discussion leaders shared their group's conclusions with the other members of the class. The instructor also suggested alternate conclusions that were not mentioned. In addition he summarized insights gained by some groups but not others, outlined the analytical steps leading to such conclusions, and occasionally commented on the mechanics of group discussion.

All discussions were tape recorded. The instructor listened to all the tapes for the purpose of evaluating individual participation in the discussions for grading purposes. The tapes were not used for feedback purposes since the instructor relied principally on direct monitoring for immediate feedback. The tapes were available to the experimental group for listening, but no check was made to see how often this was done.

The Instructional Method Rating Form was administered periodically throughout the term to the experimental group. The forms were used by the instructor as a feedback device for the small group discussions, and he took a more active or less active role in the discussion depending on the responses on the rating forms. At times he would spend a period monitoring only one group when there was evidence from the rating forms that they were having difficulty.

Results:

The achievement of course objectives was measured by the final course grade which was based on a mid-term examination, two short papers, participation in class discussion, and a final examination. The means and standard deviations of the final course grade for both groups are shown in Table 23. The difference of +5.34 in favor of the experimental group was significant at the .02 level.

Table 23

Comparison of Final Course Averages of Experimental and Control Groups in Introduction to Literature: Term I, 1966-67

	N	Mean	SD
Experimental	27	78.44	7.50
Control	29	73.10	7.94
t		2.58*	

$* p < .02$

Term III, 1966-67

Another comparative study was carried out during the third term. The instructor again taught two sections of the course, one serving as experimental, the other as the control. As before, the designation of the experimental group was made on the availability of the learning lab facilities. Table 24 shows the means and standard deviations of the entrance exam (SAT) scores and the cumulative grade point average (CGPA) at the beginning of the term. Although the experimental group scored higher on all three measures of ability, the differences were not significant.

Table 24

Comparison of Cumulative Grade Point Average (CGPA), SAT-Math, and SAT-Verbal Scores for Experimental and Control Groups in Introduction to Literature: Term III, 1966-67

	Experimental Group			Control Group			
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	t
CGPA	17	2.55	.34	33	2.47	.50	.60
SAT-Math	15	532	96	31	499	99	.25
SAT-Verbal	15	478	84	31	468	84	.37

The experimental and control procedures were essentially similar to those described above for the first term.

Results:

The means and standard deviations of the final course grade for both groups are shown in Table 25. The difference of -.45 is not significant at the .05 level.

Table 25

Comparison of Final Course Averages of Experimental and Control Groups in Introduction to Literature: Term III, 1966-67

	N	Mean	SD
Experimental	17	85.29	15.71
Control	33	85.64	15.85
t		.073	

The End of Course Questionnaire was administered to the experimental group; the majority of respondents agreed to the following statements: 1) In relation to other methods, the discussion periods placed more emphasis on comprehension and understanding than on memorization (93%). 2) In the process of discussing the materials with other students, my own ideas were often clarified (93%). 3) Because of the discussions I was more actively involved in the learning (87%). 4) In the discussion the students often mislead one another (67%). 5) The discussions force you to think and organize ideas (73%). 6) One advantage of the discussions is in the interaction with other students you get other points of view (100%). 7) A general problem in discussing with other students is discovering what parts of the material are most important (80%). 8) One disadvantage in the discussions is arriving at incorrect conclusions (73%). Sixty-seven percent disagreed with statements that a lecture would be more valuable than a discussion and that the course would have been just as successful without the discussions.

As shown in Table 26, when asked what method of instruction they would prefer for future classes, 80 percent replied that they would prefer classes which incorporated student-led discussions.

Table 26

Number and Percentage of Students Choosing Various Methods of Instruction in Introduction to Literature: Term III, 1966-67

Method of Instruction	Number	Percent
1. Total lecture - no discussions	1	7
2. Lecture and instructor-led discussion	2	13
3. Lecture and occasional student-led discussions	3	20
4. Lecture and more frequent student-led discussions	8	53
5. No lecture, total student-led discussion	0	0
6. Other	1	7

On the free-response portion of the questionnaire the most frequently mentioned advantages of the student-led discussions were the freedom of expression and more active involvement in the learning situation. One student's response was a good summary:

> "More people are able to bring their own personal questions, which you can't do in class because of lack of time. In a smaller group where you are forced to talk you naturally hear more different ideas. Through these discussions you learn to dig for yourself rather than through teacher-directed questions to bring out the right answers. You naturally prepare more because you know you must talk more. It is much freer and you can surprise yourself with what you can come up with. You learn by trying to defend your views."

The main disadvantages listed were the lack of direction, a tendency to "get off the track," and the uncertainty as to whether they were proceeding correctly.

Instructor's opinion:

The following are the instructor's written remarks concerning his experience with the methods:

> "In all honesty, I see no real difference in effectiveness between my 'traditional' teacher-led discussion method and the procedures I adopted for the small-group discussion experiment. The main advantage of the experimental method lies in the degree of involvement forced upon each student. This is a quantitative but not necessarily a qualitative difference. The main disadvantage is that feedback from the instructor must be delayed under the experimental method. Another disadvantage is that, unless attendance is required (which was not true of my sections in Term III), the experimental procedure discourages attendance on days when the student is ill-prepared; thus he loses whatever benefits may inhere in both the involvement and the feedback phases of the procedure.
>
> "I see no real difference in achievement of course objectives between the new method and the usual approach. But then, one must remember that my new method consisted of about 2/3 usual approach and 1/3 new method. During the first term of the experiment, my enthusiasm over the degree of student involvement attained under the new method somewhat blinded me to the fact that the new method tends to encourage subjectivity--at least while the discussion sessions are in progress. Since subjectivity in literary interpretation is one of the weaknesses the course is intended to overcome, I was not pleased with this development. However, by the end of the term, and after frequent feedback sessions in which objective analysis is demonstrated by students and teacher alike, there seems to me to be no significant difference in the amount of subjectivity retained under the two methods.

> "The teacher's role is at least as important under the new method as under the usual one. The preparation of good discussion guides is extremely important and very time-consuming. It must be done by the teacher, who is the only person who is capable of measuring day-to-day progress against the course objectives and of devising discussion-guide questions keyed to the needs of the class at each moment of its progress toward attainment of the course objectives.
>
> "My only suggestion for change is that the course should be taught at least once using only the experimental method: that is, with 30 small-group sessions instead of 10."

Although the achievement test results for terms I and III were not consistent, the instructor reported greater student interest and involvement during both terms. It is also worthwhile to note the instructor's suggestion that the number of discussions be increased.

D. History of Painting

This course is one of three offered to meet the art requirement in the humanities area of the general education sequence. It is required for art majors and approximately one-third of all other students elect the course most often during their freshman year. The course is offered once each term with an average enrollment of sixty-five. The historical evolution of painting from Giotto to Cezanne is covered through a concentrated study of twenty representative artists. There are two primary course objectives: the acquisition of knowledge about particular periods in the history of painting and the development of a sense of aesthetic awareness with regard to the art of the past and present.

Past procedures:

The usual instructional method was primarily lecturing by the professor with the aid of color slides. Frequent questions were posed to the students. Required reading included a small paperback text and reserve library material. In the past, student interest had not been very high, perhaps because the course is required. About 10% or 15% of the students actively participated in class discussion and made a serious attempt to use the reserve reading material. The remainder of the students were but passively involved.

Experimental procedure:

A one-week segment of the course which comprises approximately 10% of the total, and is concerned with Northern Renaissance painting, was used for the experiment. Twenty-five students selected at random formed the experimental group and the remaining twenty-three students served as the control group. Both groups were aware that an experiment was taking place.

Table 27 shows the means and standard deviations of the entrance exam (SAT) scores and the cumulative grade point average (CGPA) at the beginning of the term. None of the differences were significant.

Table 27

Comparison of Cumulative Grade Point Average (CGPA), SAT-Math, and SAT-Verbal Scores for the Experimental and Control Groups in History of Painting

	Experimental Group			Control Group			
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	t
CGPA	23	2.38	.59	23	2.46	.42	.53
SAT-Math	21	508	73	18	490	88	.72
SAT-Verbal	21	505	74	18	499	82	.26

The control group was presented with the material in the instructor's usual manner, that is, lecture with the aid of color slides and frequent questions asked by the instructor. Two seventy-minute periods were used to cover the material.

For the experimental group the procedure used was an automated lecture to the entire group during one period followed by small group discussion. The lecture material given to the control group in two seventy-minute periods was condensed into one presentation of approximately sixty minutes. The technique used was a taped lecture recorded by a professional announcer from a script prepared by the instructor which was synchronized with a continuous slide presentation. On the next class day the experimental group engaged in small group discussions of the material presented in the taped lecture. There were four groups of about six students each. A discussion guide and reproductions of the paintings were provided. The discussions were carried on entirely by the students, with the instructor monitoring from the control booth.

Results:

Achievement was measured by 34 objective questions on the material embedded in a larger examination covering other material. The results are shown in Table 28. The small difference in favor of the experimental group was not significant.

Table 28

Comparison of Achievement Test Results for Experimental and Control Groups in History of Painting

Experimental Group		Control Group		
Mean	SD	Mean	SD	t
31.32	1.49	30.72	3.71	.73

It is interesting that the experimental group did as well as the control group considering that the advantages of the recorded lecture and small group discussion were not utilized to their fullest extent. That is, the advantage of the automated presentation is that the student could use it more than once and at his own pace. Also, one would not expect that a single discussion would result in the desired motivational enhancement.

According to the instructor, student opinion regarding the desirability of the experimental procedure was divided. Dissenting students felt the taped lecture was too rapid for careful assimilation.

The instructor's opinion was the following:

> "The goal of greater student responsibility and involvement in the learning process was achieved to some degree through the use of the small group discussions which demand an active participation by each individual. The automated lecture-slide presentation should be refined so as to exploit its inherent potential, that is, its use by small groups of students in an independent study situation and its ready availability for use by individual students in a learning center.
>
> "The main concern of the experiment at this point was to seek a more efficient method of dispensing knowledge using only a relatively small segment of the course as a sample. I feel that the experimental method could be used in achieving the primary goal of the course, which is the development of aesthetic sensitivity and awareness, if the automated lecture is improved and small group discussions are used throughout the entire course."

E. Summary and Discussion

In two of the six studies the differences in achievement were significant; both of these favored the small group discussion technique. The study involving the course in Psychological Statistics provided one of the significant differences. The first trial in the literature course also yielded a significant difference favoring the small group discussion procedure. However, in the second literature study the control group performed slightly better. In the Philosophy of Man course the first study showed scores which slightly favored the experimental group. While in the second trial the results slightly favored the control procedure. Neither of the differences were large enough to be significant. In the segmental study in painting the results favored the experimental group.

In general the achievement test results showed no overwhelming evidence for or against the student learning groups as a superior procedure. These results are in agreement with those reported by Beach (1965) and the more general findings of Gruber (1965). Gruber's resume of the research findings on self-directed study might well have been written as a summary of this chapter. He states that when learning of course content is the criterion of efficiency the results generally show no powerful arguments for or against either self-directed study or conventional methods.

Throughout the comparative studies it was distressing to find many students who believed they had gained a depth of understanding and a facility in applying knowledge to practical situations that had not been measured by the criterion examinations. Their criticism raises the more important question as to whether the examinations faithfully reflected the objectives of the new teaching method.

The main objectives of the student learning groups were to increase the motivation and responsibility of the student for his own learning, force active rather than passive participation, and require the organization and verbalization of learned material. If these objectives were realized one would expect increased comprehension of the course materials, a shift of emphasis from memory and recall to understanding, the development of critical and analytical thinking, and an increased ability to apply learned methods and principles to problem solving situations. The problem was to construct examinations that would measure these outcomes.

Initially it was planned to use Bloom's Taxonomy of Educational Objectives as the basis for classifying test items on the criterion examinations. It was anticipated that the discussion procedure would result in better performance at the higher levels of the Taxonomy, i.e., comprehension, application, evaluation, etc. It was also believed that the lecture method would be at least as good as, if not superior to, the discussion method for relaying information.

Unfortunately, the process of constructing new examinations following the Taxonomy was too complicated and time consuming to complete and so, in most cases, the examinations were but revised forms of final examinations given in prior years. After these examinations were given, the project staff classified the test items according to the Taxonomy.

It was found that most examination items fell into the knowledge category, with a few items classified as comprehension and application. It was not surprising, then, that there were few significant differences favoring either method.

The evidence from student and instructor opinion, however, suggests a more favorable conclusion. In the comparative studies the majority of students and all the instructors reported an increased interest and involvement on the part of the students and a freedom from the inhibiting aspects of the large class situation. The most frequent advantage listed on the End of Course Questionnaire was the free and relaxed atmosphere of the student learning groups. Students reported feeling more free than usual to ask questions, express themselves verbally, and to disagree with or challange the statements of others. The necessity of explaining their own position to fellow students changed class preparation away from memorizing to more thinking through of the material.

The instructors in the project especially emphasized the improved communication between students and teachers. The opportunity to listen as students discussed course materials in the relaxed atmosphere of a peer group was found to be very informative. The instructors came to know better what their students were thinking about and where they were having difficulties.

In summary, both student and instructor opinions support another generalization about self-directed study made by Gruber. He maintains that when the criterion of efficiency is a group of attitudinal changes such as critical thinking, curiosity, and so forth, the comparative findings are more obviously favorable.

Chapter V. Innovative Studies

A. Introduction

After completion of the first project year it became apparent to the project directors that it would be a mistake to concentrate mainly on comparative studies. In an effort to develop the method to its full potential a decision was made to de-emphasize comparative studies in favor of trying innovative procedures. There were three major reasons for this decision. First, the comparative studies completed had shown the discussion method to be at least as effective as traditional procedures, and, in some cases, to be superior. Second, premature comparative studies may jeopardize the future of the new procedure since the technique has not been fully developed and the teachers using a new method are likely to be inexperienced in its use. Third, the relative inflexibility of procedure required by controlled studies prevents creative variation. Even before the decision to encourage innovation, many variations had already spontaneously occurred. The shift in emphasis meant encouraging the project staff to try new approaches and to discover new combinations of procedures.

The extent of the innovative studies is summarized in Table 29. Inspection of the table documents the opinion of the project directors that there was considerable enthusiasm for the opportunity to try new approaches. All of the instructors volunteered to join the project; most of them were mainly interested in improving their own teaching. During the two years there were 38 courses and over 1,000 students represented, in addition to the number participating in the comparative studies.

The common feature of the innovative studies was the use of some form of student-led discussions as part of the instructional procedure. Beyond this commonality, however, there were wide variations in procedure which makes it difficult to adequately summarize them in a single chapter.

For ease of presentation the variations in procedure will be described under the following headings: group formation, variations in lecture usage, guide sheets, discussion procedure, feedback procedure, and course examinations. Major variations of each of these factors and examples of their actual use will be presented. The last portion of the chapter will show how these variables interact using three case studies as illustrations.

Table 29

Summary of Innovative Studies

Year	Term	Number of courses	Number of students
1965-66	1	4	149
	2	6	136
	3	4	97
1966-67	1	6	218
	2	9	192
	3	9	246
TOTAL		38	1038

B. Innovative Techniques

Group formation:

One of the important aspects of the small group discussion technique is the manner in which the groups are formed. Typically, at the beginning of the course the instructor is faced with the problem of how to divide the larger class into small discussion groups.

The initial method of group assignment was in most cases a random one. For example, with a class of forty students to be assigned to eight small groups of five students each, the instructor typically grouped the students alphabetically or used some other such non-selective procedure.

As the project progressed, however, the instructors observed the effects of such factors as dominant and reticent students, personality clashes, unequal ability levels, divergent educational backgrounds, and discussion experience on group functioning. There was not always agreement upon the effect of these factors, but all were considered as important by at least some instructors. Since there were no systematic studies of these factors the generalizations made below are based primarily on the experiences of the project staff.

There were several attempts to improve the effectiveness of group discussion by using some systematic means of group formation. In one course groups were formed by placing students of both high and low ability (GPA, SAT scores) in each group. Another variation was to make homogeneous groups employing the same measures of ability. Several instructors let the students choose their own groups, while one instructor formalized this approach by constructing a sociogram and using the clusters as the basis for group formation. Another teacher used a very elaborate system for assignment which included ability measures, experience with the method, educational background, etc. There was no conclusive evidence favoring any of these methods of group formation, but as the instructors continued to use the method they tended to let students select their own groups.

Once the groups had been formed the question of changing group membership sometimes arose. Again, the instructors varied in their solution to the problem. Some insisted on the groups remaining intact and working out their difficulty. Others allowed groups to exchange members if it was mutually agreeable. Finally, some believed that there was an educational advantage in changing group membership at each meeting. As was the case in group formation, after experience with the method the instructors became more flexible in permitting students to change groups.

The size of the groups did not vary widely since the laboratory booths could not comfortably accommodate more than seven students. While other investigators have used larger groups (10 or more), the typical size of the group in this study was smaller (4 to 6). From the experience of those on the project when the group size was smaller than four or larger than six the results were not as satisfactory.

The following are some typical excerpts from students' comments on the problem of group formation:

> "I think that it would be a really good idea to split the discussion groups halfway through the course."

> "I think the five-man group is better than six because it tends to eliminate the person who sits out. Six is perhaps one person too many, so that it becomes easy for one or two persons not to discuss if they so choose. Five demands it of them as long as they are present. Four would be too few; you would have to speak too often."

> "Not (switching) each week, but every couple of weeks; three times during the term. Kids should be able to benefit from more people than just five or six. That way you get different viewpoints, and no two people could dominate in a group."

In summary, most instructors agreed that the group personnel and their familiarity with small group discussions were more important than the way the groups were formed. Furthermore, as the instructors became more familiar with the procedure they tended to give the students more freedom and responsibility for group formation.

Variations in lecture usage:

In most courses some form of lecture was integrated with the discussion procedure. When the student discussion technique was first introduced at St. Norbert College the discussions were merely adjunctive to the usual lectures. For the most part this meant replacing one lecture a week by a discussion period. However, as the project progressed and the instructors became more aware of the possibilities for change, the number of lectures decreased and the discussion periods became a more integral part of the course. In addition to decreasing in frequency the character of the lectures changed in the direction of becoming more responsive to communications from the students. The major source of these communications was the monitoring arrangement which permitted the instructor to gain insights about how students learn. An additional source was comment by the students on the Instructional Method Rating Form.

Some instructors used only brief (10-15 minute) lectures. One form was an orientation lecture given immediately before the discussion as a means of highlighting the topics to be discussed. Other instructors preferred to give brief feedback lectures following the discussion. These lectures were for the purpose of commenting on and/or clarifying the issues discussed.

The degree of formality ranged from rather formal classroom lectures to quite informal meetings. A few instructors retained the more formal lecture, that is, an information-giving lecture where the instructor does all the talking. The informal lectures were held in student lounges, seminar rooms, or, on at least one occasion, at a pizza parlor. Often these meetings did not qualify as lectures, rather they were a dialogue between teacher and students.

Some instructors chose to use no lectures at all, but provided other types of information sources for the student such as annotated bibliographies, mimeographed materials, or taped lectures. The taped lectures were of two types: some instructors tape recorded their own lectures while some used commercially available tapes made by authorities in the discipline. The taped lectures permitted the students to listen to the lecture at a time of their own choosing, and also allowed each group to proceed at its own pace. They also freed the instructor from classroom time ordinarily devoted to lecturing. In place of this class time the instructor usually met with the small groups informally.

The experience of the project staff is that retaining some amount of lectures helps the transition from the more teacher-dependent lecture to the student-led discussion procedure. Keeping some lecture periods proved to be anxiety-reducing for both students and instructors. The type of course is also a factor in the reduction or elimination of lectures. In particular, science courses and others which rely heavily on a background of factual information retained more lectures. Finally, there has been a tendency for students to reduce the importance of the lecture as a means of information getting in favor of a wider variety of sources.

Guide sheets:

The instructor also provided guidance both for student preparation and for the conduct of the discussion in the form of guide sheets. The guide sheets intended primarily for student preparation were longer and more detailed, in some cases constituting an outline of the entire course. Those used only for the conduct of the discussions were briefer and less comprehensive.

Although not all instructors employed such guides, at least some form of specific topic orientation was generally given. The guide sheets themselves took various forms (See Appendix C for examples). One type consisted of a topical outline with detailed references to source materials. In a statistics course the guide sheets were composed of questions on definitions and statistical theory and included problems to be solved by the discussion group. In other courses where the material was appropriate, case studies were presented in the guide sheets for discussion and analysis. Many of the guides were prepared with the objective of requiring the students to think and apply rather than to repeat memorized facts during the discussion.

The guide sheets varied in their specificity, some dealing with rather broad, general topics and others being more detailed. When there were a large number of specific questions the meetings became question-and-answer sessions rather than the desired discussions. However, when the questions were too broad the students would frequently stray from the topic. It appears there is a delicate balance in the degree of structure that the instructor should impose through the guide sheets. Students frequently require some form of guidance, but there is always the danger of structuring the guide sheets too much and in doing so dampening student interest, involvement, and responsibility.

Discussion procedure:

One objective of the small group discussions was to increase the students' interest, involvement, and responsbility for their own learning. Even casual listening to student groups reveals differences in discussion techniques and suggests that some procedures are better than others.

There has not been general agreement among the project staff on what are the most effective discussion procedures. Consequently the approaches were many and varied, depending somewhat on the course and probably more on the instructor's personality. The remainder of this section will describe some of these variations.

The learning laboratory facilities were arranged to permit monitoring of the discussions by the instructor. When the instructors used the facilities for the first time they were quite active in interrupting the discussions to ask questions, make comments or clear up difficulties. However, as time went on most instructors interrupted less often or ceased interrupting entirely. The frequent interruptions which occurred at first were probably due to the instructors' belief that as teachers they should take a directive role in the students' learning. Some teachers later realized that by doing this they were inadvertantly hindering the development of students' responsibility. Also, some teachers concluded on listening to tapes of the discussions that their interruptions had actually impeded the discussions.

There were many professors who continued to monitor the student discussions. One monitoring technique was to sample portions of the discussion from each group. Another was to listen to only one or two groups for the entire period. In both instances the instructor used the information gained during monitoring for later feedback sessions. Some instructors did not monitor during the discussions but later reviewed the tapes of the discussions for feedback purposes. There were some teachers who neither monitored nor listened to the tapes, preferring that the students carry on the discussions without the instructor's presence.

Two teachers, who initially monitored the discussions via the two-way communication system, later found it more effective to visit the individual groups. These teachers felt they could communicate better with the students in a face-to-face situation. For example, in the statistics course the instructor found it difficult to assist students with statistical problems over the intercom.

The question of assignment of student leaders for the discussion groups was also debated and individual instructors handled it in various ways.

During the early trials of student discussion group leaders were typically appointed by the instructor. Some instructors selected the leaders randomly while others chose students whom they thought would make good discussion leaders. These were generally considered permanent leaders, whereas other instructors appointed a new leader for each meeting. One variation designed to assure preparation was to select the leaders by lot immediately before the discussion. Another technique was to let the group choose its own leader.

As the term progressed the leadership function tended to be distributed among the group members rather than centered in one person. Those instructors who taught several courses in the project moved in the direction of allowing the groups to select their own leaders or permitting spontaneous leaders to arise. Student opinion also seemed to favor distribution of the leadership function. Toward the end of the project the question of group leadership was no longer an important issue.

Another innovation was occasioned by the necessity for one instructor to be away from the campus for a week. This occurred near the end of the term by which time the students had already become accustomed to working together in small groups. He arranged for a series of inter-group debates to take place during his absence. These were set up by the instructor but organized and conducted entirely by the students. The results from the Instructional Method Rating Forms administered during this period indicate that the students rated their interest and involvement higher than at any other time during the course.

One instructor used both student-led and instructor-led discussions with separate sections in his course. The student-led discussions, which were carried on without the instructor's presence, used groups of five students, while the instructor-led sessions were conducted in a single group of 15 students. The instructor-led section typically posed more practical topics for consideration and were better able to formulate questions. However, this section did not carry out the discussion with as much interest, involvement and concern for the topic as did the student-led section. Overall, the student-led groups were more self-reliant than the instructor-led group.

The usual arrangement in student-led discussion requires more immediate preparation for class than in a typical lecture course. Although findings from the present research indicate greater student preparation than is usually the case, it often fell short of the level desired. Since inadequate preparation is more deleterious in a discussion class than in a lecture class, the professors in the project employed a variety of techniques to increase student preparation. Many used the natural pressure from the peer group as an incentive to more thorough preparation. Some attempted to capitalize on this by periodically having the students rate their peers on the adequacy of their performance in the group. An additional pressure for preparation came from the instructor's monitoring of the discussions. Some instructors believed that comments in the form of feedback directed towards a specific discussion group had the effect of increasing preparation. Perhaps the most effective incentive was a plan for shared preparation. Essentially this involved having the students distribute the readings and background material amongst themselves so that no two students had prepared material from the same sources. During the actual discussion different students were responsible for specific portions of the material.

Feedback procedure:

Certain feedback procedures have already been discussed in the preceding sections; however, some aspects of the procedure deserve elaboration.

The feedback sessions served several purposes. One was to bring up issues missed by the group, especially those considered essential by the instructor. Another purpose was to clear up misconceptions or to correct inadequate interpretations and conclusions. Some instructors used feedback sessions to enlarge on the material discussed. These elaborations permitted the instructor the opportunity to discuss the topic in greater depth and open new avenues of thought. In addition to feedback on the content of the discussions, frequently the instructor would criticize the discussion techniques or factors of group interaction. For example, he might comment on the monopolizing of the discussion by one or two members of the group.

The most obvious source of feedback information was listening to the discussions either live or on tape. Another less obvious source was the rating form which provided information on the discussion procedure. A number of instructors used other brief summary forms on which a group member could comment about any aspect of the group discussion.

The time factor in providing feedback was also a source of variation. Some instructors gave immediate feedback during the discussions, while others preferred to delay it either until after the discussion or until the next class period. The main advantage of immediate feedback is that the material is fresh in the student's mind and interest is high, but a disadvantage is that it may interfere with the progress of the discussion. Delayed feedback does not interfere, but the context may be lost if the delay is too long.

One instructor attempted to combine the advantages of immediate and delayed feedback by listening to the tapes of each group and editing them into a composite tape. This composite tape was then used in a feedback session conducted the following class period. The tape had the effect of reproducing the context, and the instructor was present to make corrections and give comments. Students found it helpful and stimulating to hear their group on tape and to compare themselves with other groups.

Those instructors who eliminated monitoring in favor of allowing the groups to hold their discussions at their own convenience held feedback sessions with the individual groups. Since they did not monitor, the main source of feedback information was the rating forms and other communications from the individual group. Those instructors who relied upon monitoring and/or listening to tapes generally gave feedback to the whole class in a single session.

Course examinations:

A new teaching method involves more than the introduction of new instructional techniques; it also demands the development of appropriate testing procedures. The student discussion techniques were designed to develop certain processes in the student, such as comprehension, analysis and critical thinking, but the usual tests are ineffectual in measuring these behaviors, and concentrate primarily on course content. Earlier in this report there was a discussion of the difficulty in developing examinations to measure these processes. This section will detail several attempts by instructors to solve this problem.

The solution offered by one professor was use of oral examinations. He examined each student group separately, grading individual members on their answers to his questions. During the exam, after a question was answered other students were asked to elaborate on or to correct the answer. Thus the examination procedure was a sample of the type of behavior the instructor hoped the students would develop through using the group discussion techniques. The instructor pointed out that this type of examination was not only for evaluative purposes, but also served as an opportunity for learning. He also considered other factors, such as short papers, in his determination of the final grade.

Another instructor used a method of rating the student discussions, which, in conjunction with written examinations, constituted the major portion of the final grade. Each student was rated on a ten-point scale according to his performance in the areas of preparation, content, comprehension and communication. In a later attempt the same teacher did not use written examinations, but relied solely upon discussion ratings and student research reports. Since the number of students was small and the course was conducted in a tutorial manner, the instructor found this assessment procedure to be satisfactory.

Another group of instructors combined peer ratings with other measures to obtain a final grade. Periodically each member of the group was asked to rank his fellow group members and himself according to the adequacy of their contribution to the discussion. A few of these teachers asked the students to base their rankings on the eight criteria for effective discussion listed in the Manual for Student-led Discussions (See Appendix B). One instructor, who also ranked the students himself, noted very close agreement between his rankings and those of the students.

A rather elaborate grading schema was developed by one instructor. Each student's grade was based on a combination of three scores derived from the individual's performance, his contribution to the group, and the over-all effectiveness of his group. The individual score was obtained from several written exams, while the other two scores were based on instructor ratings. He reported an increase in group cooperativeness as the term progressed which he believes was due, in part, to the inclusion of a group score in the grading system.

Although there was general agreement on the need to improve evaluation procedures, there was no single technique which appeared most satisfactory. It was clear that students soon learn to study for what they're tested on, rather than for those course objectives stated in the syllabus. Experience has shown that to the extent that the student discussions become an exercise not related to course grades, the students treat them as unimportant. Therefore, it is crucial for the success of the discussion method that the evaluation procedure be directly related to the objectives of the discussion technique.

C. Case Studies

The previous sections of this chapter presented the variations in procedure independently under separate headings, while in fact they are interdependent. The case studies which follow are presented as illustrations of how these variations were combined in actual courses.

Case study #1:

There is general agreement among educational researchers that there is no single method of instruction suitable for all students. When given an opportunity to choose a preferred type of instruction students select various methods. The results from student questionnaires used in this project support this generalization.

In a psychology course in Theories of Learning an instructor offered the students several options for the way they could learn the course material. A general orientation meeting was held on the first day of class at which time an array of resources for student learning was described. These resources were: 1) A detailed syllabus describing the goals and time schedule for the course. 2) Guide sheets for each topic in the course outlining the material to be covered and offering a selected and detailed list of reference materials. 3) A series of tape recorded lectures prepared by the instructor coordinated with each topic described in the syllabus. Each lecture was accompanied by an outline and brief quizzes to permit active responding by the student while listening to the lecture. 4) Samples of the type of test items to be used in the course classified according to information, comprehension and application to indicate to the student the types of behavior he would be expected to exhibit on the examinations. 5) The opportunity to meet with the instructor for tutorial sessions either individually or in groups.

The student could elect to use any combination of these learning resources and either work independently or join with other students in student learning groups. Probably because of past experience with discussions 20 of the students elected to form discussion groups (four groups of five students each), while only one student elected to study on his own.

The only fixed dates for the course were for the examinations. Students as individuals or in groups were free to request a meeting with the instructor at any time. After the first two weeks a questionnaire was distributed asking the students to critically evaluate the procedure they were using and to suggest changes. The instructor was surprised to discover that the criticisms were mainly about the lack of ready availability of several important reference books. The students also made suggestions for the improvement of the taped lectures. However, all 21 students chose to retain the procedures they were using for the remainder of the term.

Although each student group decided on its own particular manner of approach, a pattern emerged. This pattern consisted of the following steps: 1) Each individual read the orientation chapter in a reference book frequently used by others as a textbook (Hilgard's Theories of Learning). 2) Each individual listened to the corresponding taped lecture at a time of his own choosing. 3) Each group member read additional reference materials concentrating on specific areas of difficulty. 4) The learning groups met without the instructor at mutually convenient times to discuss the material. During these meetings they took notes on areas of difficulty for later discussion with the instructor. 5) After submitting their questions to the instructor each learning group met informally with him. These meetings went beyond the mere answering of questions in that both students and instructor participated in discussion of the material.

The instructor's role was to set the limits and direction of inquiry for the course, offer the student learning materials and resources, and finally, to interact by responding to their questions and by discussing the material.

The teacher reported he was pleased by the results. Students proceeded at their own pace and exhibited greater responsibility for their own learning. They were motivated to prepare and read more thoroughly, and the overwhelming majority wanted to retain the basic procedure in the future. The instructor suggested that in the future occasional meetings of the entire class be held since some of the questions from the individual groups were repetitious. He noted that, once he had prepared his own taped lectures, he had more time to spend tutorially with small groups and with individual students. The instructor felt that his taped lectures were considerably condensed and more thoroughly prepared than his past live lectures. However, he thought it desirable to update and improve the taped lectures periodically, perhaps including answers to typical student questions. The freedom from regularly scheduled class periods seemed to offer the student an opportunity for self-directed inquiry not found in usual class procedures, and the taped lecture provided them with the security to develop on their own.

Case study #2:

A somewhat similar approach was used by a Theology instructor. The instructor joined the project with the hope of improving student interest in his course and with the hope that it would become more personally meaningful for them. The course described in this section is the final form of several innovative trials which had developed over a two-year period. The instructor attempted to deal with what he considered to be the two main problems with the discussion technique; student preparation and instructor assessment.

The question of group formation was handled by allowing the students to select their own groups. He provided his own tape recorded lectures and, in addition, selected commercially available taped lectures by well-known authorities in the field. The taped lectures were correlated with assigned readings in books and periodicals. All students were required to read the textbook, but collateral readings were divided among the group members, each member being responsible for a certain portion of the material. After reading the textbook chapter and prior to the discussion, group members met to assign the collateral readings. The instructor believed that student interdependence of this type provided a strong motivational force for preparation. The teacher also provided guide sheets to assist the students. Toward the end of the course the instructor asked the students to structure their own guide sheets.

The discussions took place only after the students had prepared in the above manner. The instructor emphasized that both individual and shared effort are necessary as adequate preparation for group discussion. The student discussions were held during the regular class time and tape recorded for later listening by the instructor. Although he did not monitor the instructor was available for consultation during the discussions.

After the discussion the teacher listened to most of the tapes and then met informally with each group at their convenience to clarify points of confusion. These weekly meetings acted as a further incentive for better student preparation.

Oral examinations were given to each group after each of three units were completed. There were no written examinations, nor were individual examinations given. The instructor emphasized the community effort in learning course materials and felt his examinations fairly assessed this effort.

A research paper was required of each student as an additional source of evaluative information. The instructor and the student worked together in a tutorial arrangement in selecting the topic and reviewing the progress of the paper. Upon completion of the paper the instructor and student met to assess its value.

The instructor felt that his innovations have greatly improved student preparation and his evaluative technique. He added, however, that the procedure will probably continue to evolve.

Case study #3:

In a required course in ethics, a philosophy instructor encouraged the student to seriously examine and further develop his own ethical position. To help the student achieve this goal the instructor presented alternative ethical positions and asked the students to apply them to themselves, both as individuals and as members of a community. The course was planned so that the students would become more independent as the term progressed, thus making self-reliance a major goal.

The discussion groups were formed on the basis of a questionnaire so that they were heterogeneous with regard to ability, cultural background, major, etc. Lectures were given by the instructor once a week during which he encouraged dialogue with the students. Guide sheets were coordinated with the lecture and discussion topics. Student-led discussions were held weekly to provide an opportunity for the application of ethical positions to concrete situations. Later in the term, with the instructor absent, the students engaged in inter-group debates on major ethical issues. All discussions and debates were tape recorded. The tapes were edited into a composite tape and used for feedback sessions with the entire class present. At this time the instructor also offered criticisms and elaborated on the material.

The assessment procedures, which were described more fully in the section on course examinations, consisted of a combination of both individual and group evaluation. Each student was graded on individual performance, on his contribution to the group, and, in addition, received a grade based on the performance of his group. The instructor noted that student reaction to the grading procedures was initially negative, particularly in regard to having their grade determined, in part, by the group performance. Later in the course the students shifted their concern from grading procedures to a concern for unprepared or uncooperative group members.

The instructor felt he had achieved the goal of making students more independent. In particular, the success of the inter-group debates were cited as evidence of this belief. He was also pleased with the development of a group spirit which was especially evident in the lessened concern for grades, the prestige associated with the inclusion of portions of their group discussion for the composite tape, and in the evident competitive spirit during the debates.

Chapter VI. Attitude and Role Changes

Perhaps more important than the discussion procedures themselves were the changes that took place in the attitudes and roles of both teachers and students. At the completion of the project a significant proportion of teachers and students had changed the conception of their roles and their ideas on how students learn. The original plan for the project was to systematically investigate the effectiveness of student discussions; in retrospect, however, the changes that took place in teacher and student attitudes were perhaps more important. The new methods of instruction became the vehicle for producing these changes. Since the objectives of the project did not focus on these changes, no provision was made for their measurement, if, indeed, measurement of them is possible. Consequently, the majority of the findings reported in this chapter will be of an anecdotal or testimonial nature. The purpose of this chapter is to describe what kind of changes occurred and offer some interpretation as to why they occurred.

A. Spread of Innovation on Campus

An indication of the unexpected enthusiasm for innovation at St. Norbert can be had from comparing figures on expected participation in the project with those actually obtained. The estimate made in the proposal was that about 450 students and eight instructors from six departments would participate in the project. Actually 1,418 students and 15 instructors from ten departments took part in the study. This growth in participation is shown in Figs. 3 and 4. The academic departments in which project courses were taught included Art, Business Administration, Biology, English, Music, Philosophy, Psychology, Sociology, Spanish, and Theology.

Obviously it is difficult to pinpoint the reasons why the faculty responded better than anticipated. Any post hoc explanation such as this can only list those factors thought to be responsible for the observed phenomenon.

Probably the most important reason for teachers joining the project was dissatisfaction with the students' response

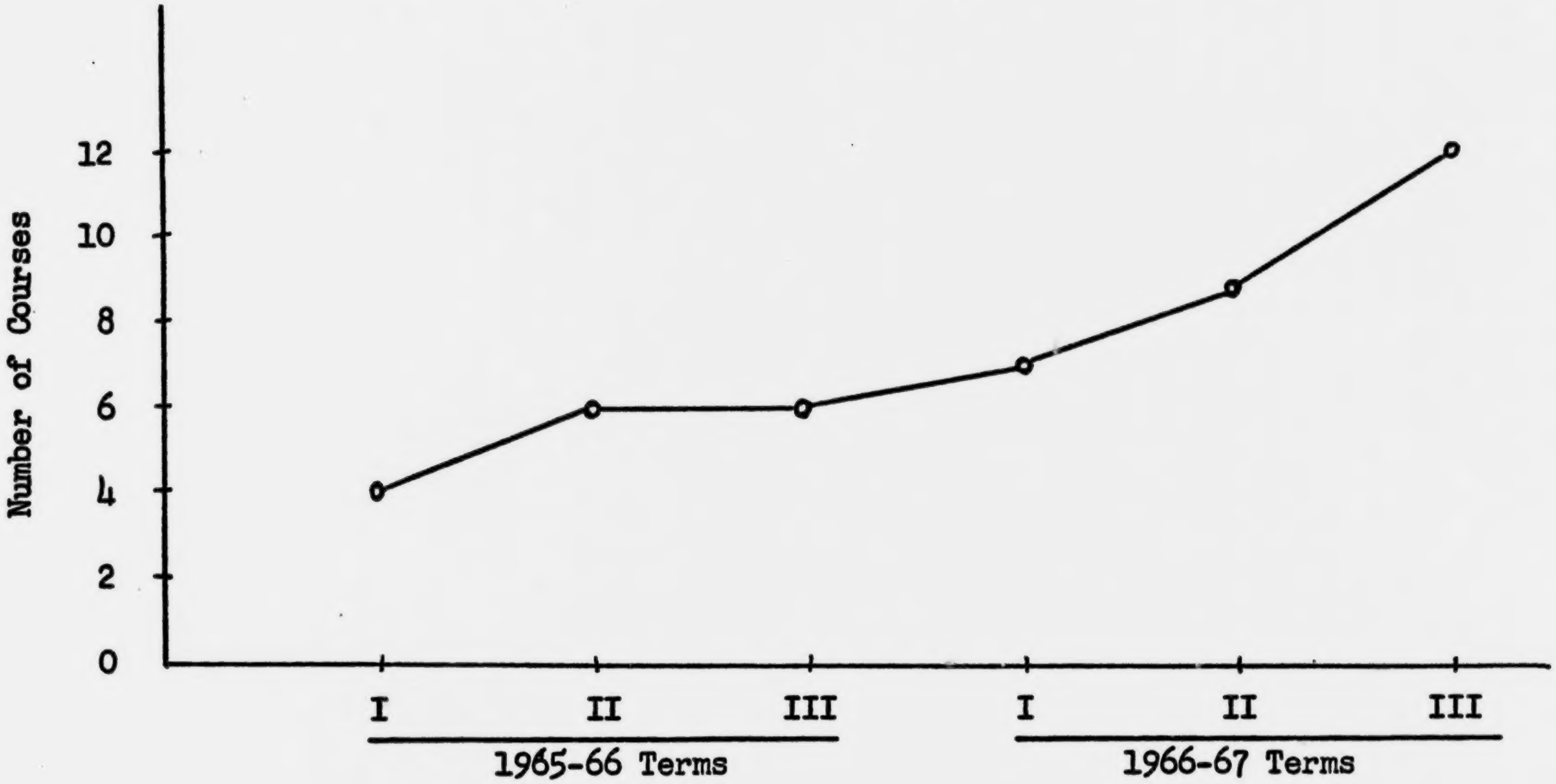


Fig. 3. Number of project courses taught in each Term.

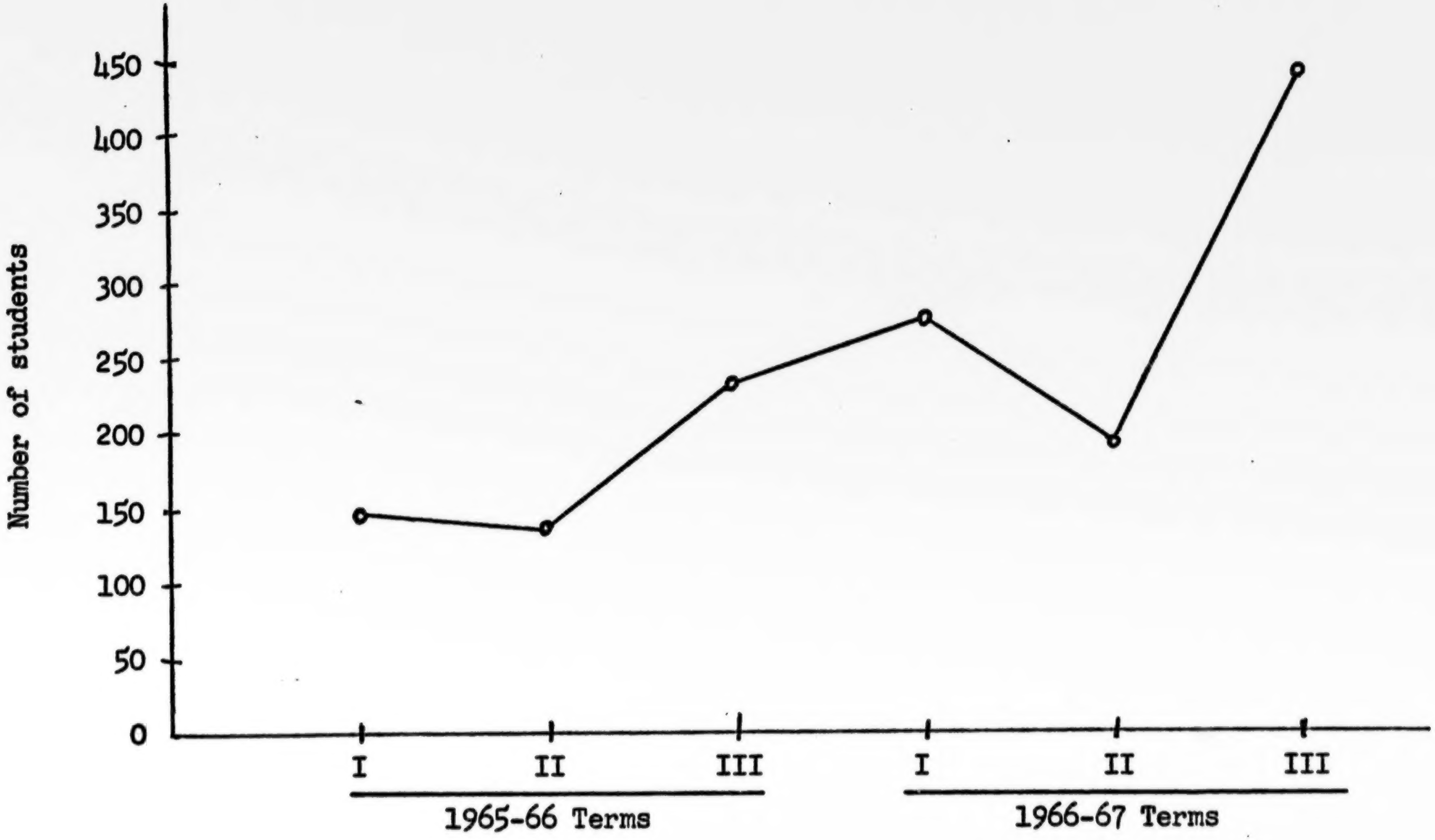


Fig. 4. Number of students participating in project courses in each Term.

to their present teaching methods. There was a common belief among those who volunteered for the project that there must be better ways to teach and motivate students. It appears that the project offered them an opportunity for the exploration of some new ways. Because the emphasis was on the evaluation of a new method rather than on a particular teacher's techniques, perhaps the usual reluctance to have one's teaching examined was lessened. The frequent feedback from the students on the rating forms was sometimes critical of the teacher's methods; however, the criticism was interpreted by most teachers to be directed toward the new procedures rather than toward themselves. The newness of the mechanical devices in the learning laboratory also had the effect of distracting the teacher from the fact that his teaching was being evaluated. The point is that because of the concentration on the method the threat to the teacher's ego was diminished.

An additional factor in explaining the large number of faculty who volunteered to participate in the project was that the new procedures did not have to be a radical departure from the teacher's usual style of teaching. Those who wanted to proceed more cautiously could retain their usual class format and introduce only occasional student-led discussions. However, in most cases some form of small group discussion gradually came to replace more and more lectures. Even in those courses where the majority of classes were devoted to discussions, the teacher still had the option of tape recording his lectures for use by students. Both of these factors helped the teacher to make the transition to the new procedures.

The initiative for the spread of innovation came primarily from the faculty and students. Both project directors were faculty members and, although there was definite encouragement from the administration, the impetus for innovation clearly came from the faculty. Initially only a few instructors participated but through informal conversation with the project staff more faculty members became interested and asked to join the project. In some instances the stimulus to use some form of small group discussion came from students who had participated in other project courses. In at least two cases, students asked teachers to include some small group discussions in the course.

The spread of innovation on the campus extended beyond the project. After the project was completed the administration of the college established a Learning Center to encourage the continuation of experimental teaching. The nucleus of the Center was the former learning lab which had been constructed for this project. Some new equipment and facilities were also added to the Center.

Since the Learning Center has been in operation for one full term at the writing of this report, the extent of continued use of the student-led discussion procedures can be assessed. During the first term following the completion of the project, 11 courses were taught with 316 students participating in some form of student-led discussion. The early reservation list for the second term shows 14 courses and 380 students will be involved. The Learning Center staff also reports having to turn down reservations because of time conflicts in scheduling courses.

B. Change in Teachers' Attitudes and Role

An important by-product of the project was the change in teachers' attitudes toward teaching and their role as teachers. Even after monitoring the first few discussions the instructors were almost universally impressed with what the students were able to do on their own. Teachers were surprised to hear students who had rarely spoken out in class not only participating actively but expressing ideas of good quality. Most teachers saw a potential for student achievement not previously recognized. As they became more convinced of the ability of their students to carry on class without them they began to question their role as teachers. Seeing that the students were able to gather information for the discussions without formal class meetings made the teachers question their role as lecturers. In listening to the discussions they also became aware of the students' varied interpretations of lecture material and this caused concern over the effectiveness of their communication. Concerns of this type led many teachers to redefine their role.

This new role meant becoming more attuned to student needs, being more aware of what their students were thinking, and recognizing the difficulties students were having with the material. Both the monitoring and the use of evaluation forms provided the teacher with prompt and direct communication from the students. To the extent that the teacher changed his course in response to these communications his role became interactive.

Even those who continued to lecture adapted their lectures in accordance with the information they had gathered from the students. Overall, the teachers became less directive and gave more freedom and responsibility to their students. Instead of anticipating where students would have difficulty, as they had done in the past, the teachers spent more time listening to the students and interacting with them. The resulting increase in student effort reinforced the teachers' new interactive role.

Once the innovative atmosphere had become established on campus the project staff observed a number of changes in teachers' attitudes. These changes were not restricted to the project staff but spread to other faculty as well. There was an increased concern with teaching methods and their effects on the students. Teachers were actually talking to each other about teaching, both informally and in innovation seminars. These seminars, arranged by the project staff, brought together interested faculty to hear what was being done in project courses. In addition to describing new teaching techniques, topics such as examinations, and course goals and objectives became part of the seminar discussions.

C. Changes in Students' Attitudes and Role

There were corresponding role and attitude changes in the students. Many of these changes have already been presented in the results sections of Chapter IV.

Perhaps the main shift in the role of the student was from a passive, receptive attitude to a more active, responsible one. One student put it this way: "Any of us could memorize and do the same silly things we did in grade school. But in the discussions we are not just taking it, we are taking it and ripping it apart and building it back up. I am being allowed to think, and I am forming my own ideas." Another stated, "It finally puts the responsibility of educating one's self on the student's shoulders, where it should be, for it is the student who will learn and understand more when it is he who discovers for himself the truth or falsity of the course's content."

Accompanying this more active role was a change in the students' expectations of the course. They were no longer satisfied with stock answers to questions and wanted to see the relevance of their learning for them. Examples of student comments were: "If he just stood up there and lectured to us we would not have asked ourselves the things we have during the discussion. We would have just taken everything in, accepted it, and not really questioned anything. We don't want pat answers." "I also find that the material discussed is much more relevant and useful to me than in a lecture where the material got into my notebook and stayed there.... I found that I was able to derive the question and then work toward a meaningful answer. In many lectures I have felt that I have gotten the answers without even asking the question, so the answers meant nothing."

Like the instructors, the students also became cognizant of the abilities of their fellow students. Through the interchange of the group discussions students achieved a greater respect for the ability and divergent views of other students. In particular there was an attitude change toward the reticent student, who seemed to blossom in the more relaxed atmosphere of the peer group. The following comments from students illustrate this point: "I think this also develops a better student-to-student relationship." "The discussions provide an opportunity to share ideas and to formulate one's own conceptions about the material covered.... They also help to develop a habit of listening as well as speaking. They help to teach respect for another person's point of view."

Another role change resulted from what was frequently a disturbing experience in the discussions. Students often realized while attempting to explain the material to others that they did not really comprehend it themselves. For some this meant changing their study habits from memorizing to seeking a more thorough understanding of the material. In the discussions themselves the students were much more interested in applying concepts and in relating them to their own experience. As one student said, "You can't just go through this course memorizing the book.... You have to understand not only what is said in the book, but this must be understood in the light of your personal existence. You have to apply these concepts to really understand them." Another stated, "Another thing we have been doing is making practical applications.... If we just went to class and were lectured to we would not do half as much thinking as we are forced to now; it would be just a memorization of facts and notes."

One student comment summarized these changes pretty well: "This discussion method certainly reveals the responsibility that each individual has for his own learning experience. For myself, I found this to be a real impetus for getting very interested in this course. I knew that I would get out only what I put into it. Through discussion, one gained understanding and not just a memorized answer. Many ideas were clarified, and new insights were gained."

These attitude and role changes became widespread as more students were involved in discussion courses for the first time and as the number of students who had had more than one discussion course increased. Without any direct assessment of the campus environment one gains the impression of an emerging change in the academic atmosphere of the college. There is evidence of increased intellectual independence and the beginnings of a tradition of intellectual self-reliance. Many other factors have contributed to this changed atmosphere, however the project was certainly an important part of the zeitgeist.

Chapter VII. Summary and Conclusions

A major trend in contemporary education is the extension of independent study beyond the usual emphasis on superior students to include students representing a wider range of abilities. One way to achieve this extension is through the use of small student-led discussion groups within the regular course system. The common feature of the variety of procedures referred to as "student-led discussions" in this report was the substitution of some form of instructorless, small (four to five students) discussion groups for the usual classroom procedures.

The objective of the study was to test the effectiveness of student-led discussions in a wide variety of courses with students of varying ability. It was expected that participation in student-led discussion groups would increase student interest and responsibility, force active rather than passive participation, require the organization and verbalization of learned material, and shift the emphasis in learning from memory and recall to understanding and application.

Variations of the new method were used in 42 courses representing ten academic departments over the two year period. A total of 1,418 students and 15 instructors participated in either comparative or innovative studies as part of the project. The comparative studies employed control groups or control procedures which pitted student-led discussions against more traditional instructional techniques. The innovative studies explored the many possible variations of the new approach and its combinations with other teaching techniques.

Six comparative studies, involving four different courses, were undertaken. The typical research design compared randomly selected groups of students of comparable ability who were taught by either experimental (student-led discussion) or control (usually lecture-discussion) treatments. The relative success of the methods was evaluated by means of achievement criteria plus student and instructor reactions.

In two of the six comparative studies the differences in achievement were significant, and both results favored the small group discussion technique. In the remaining four studies, two differences favored the experimental group and two favored the control, but none were large enough to be considered statistically reliable. These results are in accordance with those obtained by other investigators who have found the discussion method at least as effective as traditional procedures, and, in some cases, superior.

Overall, there was remarkable enthusiasm by both students and instructors for the continuation of student-directed discussions. A large majority of students who anonymously completed the End of Course Questionnaire indicated a preference for future courses taught using student-led discussions. Almost all of the instructors who participated plan to continue using the new method in subsequent courses.

The principle advantages which emerged from a tabulation of the questionnaire responses were: 1) In relation to other methods, the discussions placed more emphasis on comprehension and understanding and less on memorization. 2) In the interaction during discussion, students came to see several other points of view. 3) The students own ideas were clarified in the process of discussing with others. 4) The discussions forced students to think and organize their ideas 5) As a result of the discussion students were more actively involved in their own learning. 6) The discussions generally forced more thorough preparation than regular class meetings. 7) The discussions led to a greater interest in the subject matter of the course when compared with other methods.

The instructors in the project repeated most of the advantages listed by the students, and added some observations of their own. The improved communication between students and teachers was particularly stressed. The opportunity to listen as students discussed course materials in the relaxed atmosphere of a peer group was found to be very informative. The instructors came to know better what their students were thinking about and where they were having difficulties.

The most frequently mentioned disadvantage was the absence of the instructor. Since the instructor was not physically present the students felt that at times the discussions lacked direction and led to incorrect conclusions. Another disadvantage was that the effectiveness of group discussions depends on all members being prepared. Students were of the opinion that inadequate preparation by some members destroyed or diminished the usefulness of the discussion. Also, when one or two members are prepared and the others are not, the prepared members become discouraged and lose interest.

After the first few comparative studies it became apparent that it would be a mistake to concentrate entirely on controlled studies. The relative inflexibility of procedure required by the control design hindered the creative variation believed necessary to develop the method to its full potential. This shift in emphasis meant encouraging instructors to innovate and try new combinations of procedures.

The resulting innovations led to a wide variety of procedures with their only commonality being the retention of some form of student-led discussions. Some instructors eliminated all formal class meetings and formed small, autonomous student groups. The student groups were provided with a variety of learning materials, and were permitted to proceed at their own pace. Another variation was to involve the groups in a series of inter-group debates. Some teachers tape recorded their lectures and spent the class time ordinarily used for lecturing in meeting informally with the small groups. In general the innovative course led to a more flexible and personal relationship between student and teacher.

At the completion of the project a significant number of teachers and students had changed the conception of their roles and their ideas on how students learn. These attitude and role changes were perhaps more important than the development of a particular teaching procedure or technique.

The teachers became less directive and gave more freedom and responsibility to their students. They became more attuned to students' needs; instead of anticipating where students would have difficulty, as they had done in the past, the teachers spent more time listening to the students and interacting with them.

Perhaps the main shift in the role of the student was from a passive, receptive attitude to a more active, responsible one. Accompanying this more active role was a change in the students' expectations of courses. They were no longer satisfied with stock answers to questions and wanted to see the relevance of their learning for themselves. Students also realized while attempting to explain the material to others that they did not really comprehend it. For some this meant seeking a more thorough understanding of the material and efforts to apply concepts and relate them to their own experiences.

The impact of the project on the college can be illustrated by the establishment of a center for the continuation of experimental teaching, the widespread use of student-led discussions after the termination of the project, and a change in the academic atmosphere of the college toward increased intellectual independence and self-reliance.

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APPENDIX A

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Group Meeting Questionnaire............................ A-1

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Summary of Instructional Method Rating Forms.......... A-7

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End of Course Questionnaire........................... A-13

Group Meeting Questionnaire

Booth Letter________ Date________ Name____________________

Place a letter in front of those statements which best describe today's group meeting. Place an (A) in front of statements with which you agree, and a (D) where you disagree, and a (?) if you are unable to decide.

______Today's discussion was useful for me.

______It seemed to me that there were some students who were not prepared.

______Several times statements which seemed incorrect were not challenged by other group members.

______One or two people dominated today's discussion.

______I had the feeling that many of our conclusions were incorrect.

______As far as I'm concerned today's discussion was in some ways a waste of time.

______There was difficulty in understanding and using the guide questions prepared for the meeting.

______The questions on the guide sheet were not covered to my satisfaction.

______Group members often made statements without supporting evidence.

______There were several controversies and disagreements in today's discussion.

______I found the discussion quite interesting.

Please use this space to comment on any of the above statements or to make suggestions for improving the effectiveness of your group.

Discussion Rating Form

Group Letter____ Date______________ Name________________
(Optional)

Course Title________________ Instructor________________

To the student: You are asked to make this appraisal as a help to your instructor's evaluation and improvement of instructional procedure.

Each item is rated on a scale which extends from the worst possible condition on the left to the best possible condition on the right. A description corresponding roughly to a numerical equivalent is given below each line. In answer to each item proposed about today's meeting, circle the number that corresponds with your estimate. Please be open, objective, and frank in your rating.

1. The value of today's discussion for me as a learning experience was

0 1 2 3 4 5 6 7 8 9 10

Not valuable at all — About average — Extremely valuable

2. My own preparation for today's discussion was

0 1 2 3 4 5 6 7 8 9 10

Not prepared at all — Good enough to get by — Very well prepared

3. The preparation of the other group members seemed

0 1 2 3 4 5 6 7 8 9 10

Not prepared — Good enough to get by — Very well prepared

4. How would you rate the effectiveness of the questions given by the instructor to guide the discussions?

0 1 2 3 4 5 6 7 8 9 10

Poor: actually hindered learning — Adequate — Excellent guide: facilitated learning

5. How much have the discussions stimulated your interest in the course?

0 1 2 3 4 5 6 7 8 9 10

No stimulation — About average — Inspired a strong desire to learn more

6. To what extent did the discussions encourage independent thinking in the solution of problems?

0 1 2 3 4 5 6 7 8 9 10

Not at all — To some extent — Very much

7. How would you rate the effectiveness of the discussion as a means to a more thorough understanding of the material?

0 1 2 3 4 5 6 7 8 9 10

No improvement: more of a hindrance — Helped somewhat — Helped a great deal

Instructional Method Rating Form

Course Title__________________ Instructor_______________

Group Letter__________________ Date______________________

To the student: In this rating form you are asked to make evaluative judgments about today's class. The primary interest in asking you to do this is in order to compare different methods of instruction, rather than characteristics of the teacher.

Each item is rated on a scale which extends from the worst possible condition on the left to the best possible condition on the right. In answer to each item proposed about today's meeting, PUT A CIRCLE around the number that corresponds with your estimate.

1. How much has today's class stimulated your interest in the course?

0 1 2 3 4 5 6 7 8 9 10

No stimulation — About average — Inspired a strong desire to learn more

2. How much did today's class stimulate in you a sense of independence and responsibility in your own growth and learning?

0 1 2 3 4 5 6 7 8 9 10

Not at all — Moderately so — To a great degree

3. How much knowledge or information did you gain in today's class?

0 1 2 3 4 5 6 7 8 9 10

Nothing I didn't already know — A moderate amount — A great deal

4. My own preparation for today's class was

0 1 2 3 4 5 6 7 8 9 10

Not prepared at all — Good enough to get by — Very well prepared

5. How would you rate your own active attention and involvement during today's class?

0 1 2 3 4 5 6 7 8 9 10

Not involved: inattentive — Occasional lapses of attention — Quite attentive and involved

6. How free did you feel in today's class to ask questions, disagree or express your own ideas?

0 1 2 3 4 5 6 7 8 9 10

Not free at all: inhibited — Fairly free — Completely free and spontaneous

7. How much has today's class pointed out gaps and inadequacies in your comprehension of material?

0 1 2 3 4 5 6 7 8 9 10

Not at all — Somewhat — Quite a bit

8. To what extent did today's class encourage critical thinking in the solution of problems?

0 1 2 3 4 5 6 7 8 9 10

Not at all — To some extent — Very much

9. The overall value of today's class for me as a learning experience was

0 1 2 3 4 5 6 7 8 9 10

Not valuable at all — About average — Extremely valuable

Please use this space to comment on any aspect of today's class or to make suggestions for improvement.

Summary of Instructional Method Rating Forms Date__________

Course__________________________ Instructor________________

												Median All Groups
f												
Interest	0	1	2	3	4	5	6	7	8	9	10	
Mdn												________
f												
Responsibility	0	1	2	3	4	5	6	7	8	9	10	
Mdn												________
f												
Information	0	1	2	3	4	5	6	7	8	9	10	
Mdn												________
f												
Own Preparation	0	1	2	3	4	5	6	7	8	9	10	
Mdn												________
f												
Involvement	0	1	2	3	4	5	6	7	8	9	10	
Mdn												________
f												
Expression	0	1	2	3	4	5	6	7	8	9	10	
Mdn												________

Median
All Groups

f

Comprehension 0 1 2 3 4 5 6 7 8 9 10 ________

Mdn

f

Thinking 0 1 2 3 4 5 6 7 8 9 10 ________

Mdn

f

Value 0 1 2 3 4 5 6 7 8 9 10 ________

Mdn

Comments and Suggestions for Improvement

Student Opinion Questionnaire

Your response to the questions on this form will provide us with valuable information regarding student opinion about student-led discussion groups. We are particularly interested in gathering your evaluations of the learning experience in using the method. Your answers will in no way influence your course grades; please be objective and open in your answers. The results of this questionnaire will not be made available to your instructor until after final grades are turned in to the registrar.

1) Briefly state your general reaction to this course.

2) What is your candid opinion about the effectiveness of student-led discussion groups as compared with usual methods of instruction?

   a. Main Advantages

   b. Main Disadvantages

3) Based on your experience with student-led discussions, how would you improve the procedures to make them more effective for the student?

4) In your opinion, are there any advantages to student-led discussion which would not be measured by course examination?

5) Considering all factors, I would prefer to learn in courses which involve: (Check one)

_____Lectures by the instructor with no student discussions.
_____Lectures by the instructor and class discussions led by the instructor.
_____Lectures by the instructor and occasional student-led discussions.
_____Lectures by the instructor and more frequent student-led discussions.
_____No lectures by instructor, with all student-led discussion.
_____Other (Specify)_______________________________

____

6) Place a letter in front of those statements which describe the majority of student-led discussions in which you were a participant. Place an (A) in front of statements with which you agree, and a (D) where you disagree and a (?) if you are unable to decide.

_____The discussions generally made me prepare more thoroughly than if I were attending a regular class meeting.

_____In relation to other courses, this course placed more emphasis on comprehension and understanding than on memorization.

_____In the process of discussing the materials with other students, my own ideas were often clarified.

_____Because of the discussions I was more actively involved in the learning.

_____An important aspect of the method was the instructor's response after listening to the tapes of our discussions.

_____The discussions have led to a greater interest in the subject matter.

_____The discussions resulted in my questioning ideas and concepts more than I usually do.

_____The guidance by the instructor was generally useful to the group.

_____The ratings by other students encouraged me to study more.

_____The questions to guide our discussions seemed valuable.

_____Because of the discussions I understood better subsequent class meetings and readings.

_____The discussions were seldom directly related to the tests in the course.

_____The preparation for the discussions involved too much time.

_____The discussions were largely a rehash of what we already knew.

_____The course probably would have been just as successful without the discussions.

_____The activity of the instructor was more important than the discussion method.

Comment here on any of the above statements:___________

____

____

____

INFORMATION:

TITLE OF COURSE:____

In how many discussions have you participated during the term?____

Your cumulative grade point average:______________________

Your last semester grade point average:____________________

Thank you for your cooperation!

End of Course Questionnaire

Instructions

Your response to the questions on this form will provide us with valuable information regarding student opinion about the discussion (lab) periods. We are particularly interested in gathering your evaluations of the learning experience in using the method. Your answers will in no way influence your course grades; please be objective and open in your answers. The results of this questionnaire will not be made available to your instructor until after final grades are turned in to the registrar.

1.) What is your candid opinion about the effectiveness of the discussion (lab) period as compared with usual methods of instruction?

a. Main Advantages

b. Main Disadvantages

2.) Considering all factors, I would prefer to learn in courses which involve: (Check one)

_____Lectures by the instructor with no discussions of any kind.
_____Lectures by the instructor and class discussions led by the instructor.
_____Lectures by the instructor and occasional student-led discussion.
_____Lectures by the instructor and more frequent student-led discussion.
_____No lectures by instructor, with all student-led discussions.
_____Other (Specify)______________________________

____

3.) Circle the letter in front of those statements which describe the majority of discussions in which you were a participant. Circle the A in front of statements with which you agree, the D where you disagree and the ? if you are unable to decide.

A ? D The discussions generally made me prepare more thoroughly than if I were attending a regular class meeting.

A ? D In relation to other methods, the discussion periods placed more emphasis on comprehension and understanding than on memorization.

A ? D In the process of discussing the materials with other students, my own ideas were often clarified.

A ? D Because of the discussions I was more actively involved in the learning.

A ? D In the discussion the students often misled one another.

A ? D The discussions have led to a greater interest in the subject matter.

A ? D A lecture period would be more valuable than a discussion period.

A ? D The discussions force you to think and organize ideas.

A ? D One advantage of the discussions is in the interaction with other students you get other points of view.

A ? D Because of the discussions I understood better subsequent class meetings and readings.

A ? D The discussions were helpful in preparing for the tests in the course.

A ? D As a result of the discussions I was better able to relate course knowledge to everyday experience.

A ? D The course probably would have been just as successful without the discussions.

A ? D A general problem in discussing with other students is discovering what parts of the material are most important.

A ? D One disadvantage in the discussions is arriving at incorrect conclusions.

Comment here on any of the above statements:__________

____

INFORMATION:

TITLE OF COURSE__________________ SECTION__________

In how many discussions have you participated during the term?________

Your cumulative grade point average:________________

Your last semester grade point average:______________

Thank you for your cooperation!
Cooperative Research Project Staff

APPENDIX B

Page

Manual for Student-led Discussions...................... B-1

MANUAL FOR STUDENT-LED DISCUSSIONS*

I. Introduction and Purpose

Previous research has indicated the value of group discussion as a learning technique. In contrast to passive attendance at lectures, group discussion encourages active participation in the learning process and makes use of principles of learning believed to be important in educational achievement, i.e., student motivation, organization of material to be learned, verbalization of concepts, feedback from the instructor, and increased responsibility for learning. The purpose of small, student-led discussions is to provide an atmosphere which allows these and related principles to operate. The success of the procedure, however, depends heavily upon the degree of responsibility for learning undertaken by the members of the group. The mere formation of a group does not guarantee its success. The purpose of this manual, therefore, is to suggest procedures for effective group discussions.

II. Procedures for effective group discussions

Previous experience has shown that a most important factor for successful group discussions is careful preparation by all members of the group. This preparation should go beyond the mere reading of material on the topic, and should include a critical examination of the concepts involved. As you read, you should keep in mind questions such as "What other aspects, or approaches are there to this question?", "Do I agree or disagree with what I have read?", "What different ways are there of looking at the matter?", "What else might be said about it?". By doing this you will be better prepared to discuss the topic, beyond giving a mere rehash of it. In response to course evaluation forms both students and teachers agreed that adequate preparation is essential for effective discussion. Inadequate preparation by some members destroys or diminishes the usefulness of the discussion. Also, when one or two members are prepared and the others are not, the prepared members become discouraged and lose interest.

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*Portions of this manual were taken from a similar manual prepared by Professor Clarence Leuba at Antioch College.

A second important factor contributing to effective discussions is interaction, as contrasted with monologues. Interaction involves listening attentively to what another person has to say, drawing him out, and then reacting to what he has said in a manner which will further the understanding of the topic under discussion. If you do not understand what another student has said, or do not agree with what he has said, ask him to explain further or to give evidence supporting his position; otherwise, the meetings may become a jumble of the esoteric, of current fads, and of personal opinions, anecdotes and experiences.

Other helpful procedures are to restate what has been said in one's own words, and to inquire, "Is this what you mean?"; to make thinking more precise through illustrations from everyday experience; to seek implications and applications; to see a topic from as many angles as possible; to question the reliability of sources of information; not to be satisfied with incomplete answers; to summarize periodically and so on.

One of the important advantages in any type of student-directed learning is an increase in the student's responsibility for his own learning. Our experience has shown that this shift in responsibility does not automatically accompany the use of student-led discussions. Students who have for years depended on teachers to tell them the "right" answers find this increased responsibility difficult to accept. This is especially true at a college where the prevailing student culture does not encourage independent intellectual inquiry.

Some students are bothered by the absence of the instructor during the discussions, and feel uncertain and insecure with the procedure. Part of this feeling is related to the fear that students will mislead one another, reach faulty or incorrect conclusions, or focus on the nonessentials in their group discussions. Experience with the discussion method has shown, however, that the advantages gained by the absence of the instructor (e.g., an increase in analytical and critical thinking, the assumption of more responsibility for one's own learning, less emphasis on memory and recall of facts, etc.) outweigh these feelings of uncertainty.

Further, more successful groups are characterized by flexibility and spontaneity; they are not formal and rigid;

they modify the guide questions and depart from them without losing continuity and purposeful direction in the discussions.

Finally, a word about attendance. Since the effectiveness of the discussions depends upon the contribution of its members, the absence of one or two members will seriously affect the quality of the discussion. Also, from data gathered in the past years, there appears to be a positive relationship between the number of discussions attended and the final course grade.

In summarizing this section we can list several characteristics of the effective group member:

1. He is well prepared and makes relevant contributions to the discussions. (He has knowledge of the material and is willing to share it.)

2. He helps to clarify and elaborate concepts which are difficult. (He is able to translate concepts from the readings into his own words and explain them to the group.)

3. He seems to really understand a concept instead of just giving a memory definition of it. (He has insight or seems to be able to get to the heart of the matter.)

4. He applies concepts or material from the readings to familiar situations. (He illustrates or gives examples from everyday life which aid in your understanding of the material.)

5. He is critical of incomplete or inaccurate contributions by others in the group. (He doesn't let a faulty or incomplete statement pass without challenging it; he also speaks up when something isn't clear to him.)

6. He brings together or helps to clarify what other members of the group are saying. ("It seems to me this is what we are saying......")

7. He is an effective leader in keeping the discussion relevant, eliciting active involvement from the other members, and assisting in making the discussion useful. (He is able to lead the discussion

without dominating it, and draws out reticent participants.)

8. He is able to successfully relate the new material to former concepts covered in this and other courses.

III. Conduct of the sessions

The discussions will take place on the scheduled day and hour in the booths located in room 206 Main Hall. You will be assigned to a group, and each group will be assigned to a specific booth.

The booths are specially ventilated so that once the discussion has begun, the door should be closed to provide a minimum of distraction to other booths.

If a discussion leader has been designated, he should see to it that the discussion begins with a minimum of delay. Although it is his responsibility to keep the discussion moving, the other members should also assume leadership functions, so that the leader no longer has to perform them all himself. The group leader is, of course, not an instructor; it is not his duty to dispense knowledge or to answer questions. He is responsible only for well-organized, effective examination by group members of questions pertinent to the discussion.

It is everyone's responsibility, and not alone that of the leader, to help in drawing out the other members of the group, to restate what has been said to be sure it is clear and understood, to challenge faulty or incomplete statements, to keep the group working on the topic and not diverted into irrelevant matters, and to see that what has been accomplished is summarized periodically.

Don't hesitate to ask what might appear to be simple or naive questions to which many people might take a pat answer for granted. Such questions, provided the questioner has a good factual background, are often basic ones, need to be asked, and stimulate a questioning of ordinarily-made assumptions. Don't leave a topic without first inquiring: "Is there anything else someone wants to say about this topic?"

Should you desire to call the instructor during the discussion simply depress the lever on the speaker while announcing your booth letter, then release the lever.

APPENDIX C

Samples of Discussion Guide Sheets

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Ethics... C-1

Special Topics on New Testament.......................... C-3

Theories of Learning..................................... C-4

Psychology as a Social Science........................... C-5

Psychological Statistics................................. C-7

Ethics

Discussion Guide

Material:
  Lecture #3 in God Sex and War
  The Mill on the Floss (handout)
  Scepticism and Scholarship (handout)

Consider also the following excerpts from Playboy June 1966 by W. Benzon:

> ...if the sexual relationship...is between two responsible consenting persons, who understand its nature, it cannot... be judged dehumanizing, degrading, or exploitive... As long as mutual consent is a precondition for a sexual relationship, casual sex is not exploitive... If the desire is mutual, a sexual relationship is moral regardless of depth... The most eloquent defense of casual sex is the fact that such relationships do exist...

Topic A: What, if any, difference is there between:
  John is in love with Mary.
  John loves Mary.

If love is self-sacrifice (as described in GS&W pp. 94/95 in the case of the nearly married couple who demonstrate that they love each other, not that they are in love with each other--although the latter surely is the case as well--) then how is premarital intercourse to be defended?

Consider Benzon's consenting couple:

a) If they are really responsible, will they consent?

b) To whom are they responsible? themselves alone? society? God?

c) CAN THEY IN THIS SITUATION EFFECTIVELY AND PERMANENTLY INSULATE THEMSELVES FROM SOCIETY? Even if they are not 'guilty' of exploitation relative to themselves, is it possible that they are exploiting others, eg. future marriage partner?

d) Can Benzon distinguish the liaison of engagement from love-for-sale?
e) What principle does Benzon ultimately use to defend his position?

Topic B: Discuss the dilemma present in the following items in conjunction with the practical suggestion offered in GS&W p. 97 middle:

1) In The Mill on the Floss Maggie finds herself in a situation that she is not prepared for.
2) Your social group makes you feel like a real 'square' suggesting you are ignorant, a stick-in-the mud, and that you had better GROW UP if you want a date etc.
3) The pub song goes: Here's to the maid who steals a kiss etc., seeming to give the impression that a person, particularly a girl, has a rather limited range of choice in life.

Topic C: Discuss Scepticism and Scholarship:

1) Does a sceptical appraisal of values entail a rejection of values?
2) Is it better to be a critical and committed atheist or an unenlightened and uncommitted Christian?

Special Topics on New Testament

Discussion Questions

1. Paul's idea of sin and its consequences on man in history forms a basis for a portion of his moral teachings. Summarize his thoughts on sin and its effects.

2. By presenting Baptism as a new creation and new life, Paul lays the foundation for a positive Christian morality. How is this developed in these areas:

   (a) The call not to sin and the sinlessness of the Christian (eschatological perspective)?

   (b) The effects such new life has on the Christian (v.g. liberty)?

   (Note: at this point, it might be profitable to relate this Pauline notion of Baptism as new creation with the idea seen in the first part of the course that the proclamation of the kingdom is the source of moral obligation).

3. How can justification by faith be reconciled with judgment based on works? How does this relate to Christian hope?

4. Develop Paul's teaching on conscience.

5. Paul was a man of his time but was also totally immersed in Christ. These two poles influenced his work as a preacher. What does this say to us today about adapting to our culture?

Theories of Learning

Discussion Guide
Thorndike's Connectionism

What is the background or historical context within which Thorndike developed his theory?

Why is his theory called connectionism?

What was the main content and importance of his 1911 work "Animal Intelligence"?

What is a typical experiment which gave rise to Thorndike's formulation of laws of learning?

What was the basis for his three original primary laws of learning?

How were these laws criticized and later modified?

Why did he formulate subsidiary laws?

How was his theory modified after working more with human subjects? (after 1930)

What are examples of experiments designed to test Thorndike's theory?

What are belongingness and spread of effect?

How is his work related to educational theory?

Sources

Hilgard, E.	Theories of Learning (all of chapter 2)
Hill, W.	Learning (brief section chapter 3)
Chaplin and Krawiec	Systems and Theories (good summary p. 183-192)
Postman, L.	Psychology in the Making (p. 332-352 good overview)
McGeogh and Irion	Psychology of Human Learning (on his contribution to human learning)

Psychology as a Social Science

Guide Questions for Chapter 4
and
"Ulcers in Executive Monkeys"

1. What hypotheses about the development of ulcers in human subjects can be made from the Brady study? How would one go about testing these hypotheses?

2. Apply the conceptualization of conflict detailed in the textbook to the following situations. Discuss possible ways of resolving the conflicts.

Type of conflict

approach - avoidance

approach - approach

avoidance - avoidance

   a. The conflict situation faced by the executive monkeys in Brady's study.

   b. After a long, strenuous day a student is both tired and hungry. He pauses momentarily trying to decide whether to eat or go to bed.

   c. A child is told he must do his arithmetic problems or get a spanking. He sits at his desk looking at the problems and day dreaming about tomorrow's football game.

   d. A young bride faces marriage with great anxiety. She was brought up in a rigid atmosphere where sexual activities were treated as sinful and ugly.

   e. A young man is concerned about making the Dean's list and the college football team. As he sees it, if he doesn't make the Dean's list he will incur disapproval from his parents, and if he doesn't make the team he will lose the esteem of his friends.

3. Apply the concepts of defensive behavior to the following situations. Identify the defensive mechanism and show how it is a useful mechanism for that person.

   a. A protective woman who wants to hold on to her son as long as possible does not want him to date because his school work may suffer or he might fall in with unwholesome company.

   b. Alva was notably unattractive, because she was overweight and had large, coarse features. Her father was a bartender, an occupation not esteemed in the conversative small town's social scheme. Alva always uses excessive make-up. She appeared in school well-coated with cosmetics with her lips drawn in a most exaggerated manner. The painting did not render her beautiful, but it made her noticed. Later Alva became a cheer leader and was an excellent one, her excessive use of make-up decreased.

   c. A man was refused promotion by a boss he considers unfair. At home that evening no one could seem to please him, due to his surly, aggressive attitude.

Ps 220

Psychological Statistics

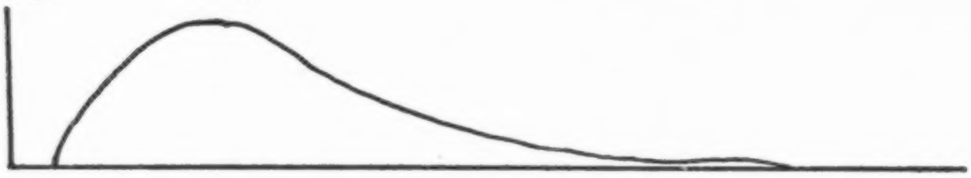
Discussion Questions - Chapter 3

1. What are the properties of the mean? the median? the mode?

2. In what situations would you use the mean as the measure of central tendency? the median? the mode?

3. Which measure of central tendency is most affected by extreme scores? Why?

4. In the highly skewed distribution below, indicate (by drawing a vertical line at that point) and label the relative positions of the mean, median, and mode. What would be the best measure of central tendency to use in this situation? In what direction is the distribution skewed?



5. If one obtains a bimodal distribution, what factors may have been responsible for obtaining such a distribution? What measure of central tendency would be used in a bimodal distribution?

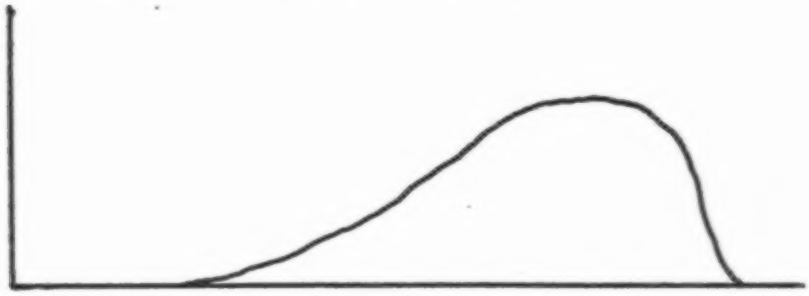
6. What are the advantages of the mean as a measure of central tendency? the median? the mode?

7. Calculate the mean, median, and mode for the following distribution:

x	f
50-52	5
47-49	8
44-46	12
41-43	16
38-40	10
35-37	6
32-34	2

8. Which measure of central tendency is more stable (i.e., tends to fluctuate less from one sample to another when these samples are drawn from the same population)?

9. Given the distribution below, could one determine the mean, median and mode without having access to the raw scores? If so, how would you go about determining these three measures of location?



Ps 220

Psychological Statistics

Discussion Questions - Chapter 4

1. What, basically, is the meaning of "measures of Variability"? Why do we report measures of variability?

2. For each measure of variability discuss the following:

   a) When is it used?
   b) How is it obtained?
   c) What are its properties?
   d) What are its advantages? Weaknesses?

3. What measures of variability may be used in conjunction with the mean? the median? the mode?

4. What is the most widely used measure of variability? Why?

5. For the following distribution, compute R, MD, and SD:

x	f
50-52	5
47-49	10
44-46	15
41-43	20
38-40	15
35-37	10
32-34	5

6. Check the frequencies in the above distribution to see if the properties of Q and SD hold up; (i.e., are there 50% of the cases between +Q and -Q? Are there 68% of the cases between +1S and -1S?

7. For the following 3 distributions what measures of central tendency and variability would be appropriate?

a)

x	f
90-99	100
80-89	150
70-79	90
60-69	10
50-59	90
40-49	150
30-39	90

b)

x	f
90-99	20
80-89	30
70-79	20
60-69	25
50-59	40
40-49	100
30-39	120

c)

x	f
90-99	10
80-89	20
70-79	35
60-69	55
50-59	35
40-49	20
30-39	10

8. Without calculating, tell which group has the greatest variability, the smallest variability. What is the rank order, lowest to highest variability?

a) x	b) x	c) x	d) x	e) x
10	60	2	20	102
15	65	3	30	103
20	70	4	40	104
25	75	5	50	[illegible]
30	80	6	60	106
35	85	7	70	107

9. What is the effect on the mean and standard deviation if we:

1) add a constant amount to every score.
2) multiply each score by a constant.
3) both multiply by and then add a constant to every score.

10. What percentage of the total cases is represented in the following:

a) between +1S and -1S?
b) above +1S?
c) below +2S?
d) between +1S and +2S?
e) below -2S?
f) between -2S and +1S?

11. Given the following:

$N_A = 40$ $N_B = 20$ $N_C = 30$

$\overline{X}_A = 50$ $\overline{X}_B = 60$ $\overline{X}_C = 0.2$

$SD_A = 20$ $SD_B = 20$ $SD_C = 0.1$

a) Which group, A, B, or C, has the greatest relative variability? the least?

b) What is the combined SD for all three groups?

12. Given the following:

$\overline{X}_A = 100$ $\overline{X}_B = 80$ $\overline{X}_C = 100$ $\overline{X}_D = 85$

$SD_A = 2$ $SD_B = 10$ $SD_C = 30$ $SD_D = 2.5$

a) In which group would a score of 90 represent the highest relative score? the lowest relative score?

APPENDIX D

ERIC Resume Form

Page

ERIC Summary.. D-1

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TITLE

Teaching Process as a Learning Experience:
The Experimental Use of Student-led Discussion Groups

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ABSTRACT

The purpose of this study was to investigate the effectiveness of small student-led discussion groups as a method of instruction. Two types of studies involving over 1,400 students in 42 courses were performed: (1) comparative studies which employed control groups pitting small, instructorless discussion groups against more traditional instructional procedures, and (2) innovative studies which explored the many possible variations of the new approach and its combinations with other teaching methods. When achievement was the criteria of efficacy the results of the comparative studies showed no strong evidence for or against the use of student-led groups. However, when the criteria was student and teacher opinions, the comparative findings were more obviously favorable. Both students and teachers reported gains in student responsibility, student interest and motivation, student-teacher communication, and a shift from memorization to comprehension and understanding. The innovative studies freed the instructors from the constraint of control procedures and resulted in several creative variations in the use of the technique. At the completion of the project a significant number of teachers and students had changed the conception of their roles and their ideas on how students learn. These role changes and the impact of the project on the campus are also discussed.